

# A review of the genera associated with the tribe Asthenini (Lepidoptera: Geometridae: Larentiinae)

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**SYNOPSIS.** The Asthenini (Geometridae, Larentiinae) are reviewed at the generic level. Critical examination of the composition of the tribe has led to the recognition of 18 genera, with the species '*Chalyboclydon*' *flexilinea* Warren unplaced. Species are listed under all of the genera identified as Asthenini; their broad distribution is noted; and remarks on peculiarities are noted. Seven other genera that have been associated with the tribe are also considered, and reasons for their exclusion are given. A lectotype is designated for the non-asthenine species *Chalyboclydon marginata* Warren.

## INTRODUCTION

The primary purpose of this paper is to review the genera of the larentine geometrid tribe Asthenini. Most of the genera occur in the Palaearctic and Oriental regions, with a few genera in Australia and New Guinea, three genera in the Nearctic, one genus in the Afrotropics and one in the Neotropics. Representation is particularly high in China and the Himalayas. Although we are not entirely satisfied with our final 'definition' of the tribe, we hope, at least, that this contribution will provide a material contribution to our understanding of part of the asthenine/eupitheciine complex. It builds on the extensive study of the Chinese species of Larentiinae by Xue & Zhu (1999). The study continues those efforts to produce global generic reviews of selected groups of Geometridae (e.g., Pitkin, 1996; Scoble, 1995; Scoble & Krüger, *in press*). Given the inadequacy of the tribal classification of the subfamily, we believe that taxonomic progress is more likely to be made at the level of genus and species. For examples of recent contributions of this kind see Choi, 2000; Parra, 1991; Parra & Santos-Salas, 1991; Schmidt, 2001; Xue & Zhu, 1999).

We have two specific aims. First, given the lack of an explicit definition of the Asthenini, the tribe is examined critically for coherence, so we use this paper as a means of exploring taxonomic problems. Our concept of the tribe is presented through the description, diagnosis and generic checklist, which follow a section in which significant taxonomic characters are reviewed. Second, despite the shortcomings of the tribal definition, we provide a treatment of the genera and state our reasons for their inclusion in the tribe. Certain genera that have been associated with the Asthenini in the past, or that we ourselves consider close to the tribe, are treated at the end of this work with an explanation as to why they have been excluded from the Asthenini.

## Comments on the tribal classification

In reviewing the larentine tribe Asthenini, we were faced with a question common to virtually all global taxonomic treatments: how inclusive should we be in associating genera with a higher taxon originally defined from relatively few European species? Our approach has been to compare as many potential asthenine taxa as possible against the existing literature and discuss their inclusion in, or their exclusion from, the tribe.

A difficulty in deciding which genera to include was that the tribal classification of Larentiinae as a whole remains significantly unresolved. It has developed largely from a series of regional studies. The Asthenini were established (as subfamily Astheninae) by Warren (1893: 362). Besides associating *Asthenia*, *Hydrelia* and *Chalyboclydon* he included a part of the Trichopterygini, but he gave no definition or description of the tribe.

Although L.B. Prout, in his studies of larentine genera, also never actually described the tribe, many of the genera we associate with the Asthenini today were treated in reasonably close proximity (e.g., in the sections on Larentiinae in Prout, 1912–1916). The group (as 'Astheninae') was more effectively founded by Pierce (1914: 38), whose diagnosis rested on characters of the genitalia, but included just the genera *Minoa* and *Asthenia*, for the study was restricted to the British fauna alone. Pierce's diagnosis was based on a reduced uncus, entirely attached to the anal tube, the presence of an extended valval sacculus in the male, and a long evenly spined signum on the corpus bursae of the female. Pierce also noted the presence of labides (arm-like sclerites of the diaphragma) in each species included in the tribe, but did not include these structures in his tribal diagnosis, presumably because they occur elsewhere in Larentiinae, notably in Eupitheciini.

McGuffin (1958), still in a pre-cladistic age, and in a study restricted to larentine larvae, published a

figure in which Asthenini were represented as the most basal group of Larentiinae from which four other tribes arose directly. In cladistic terminology, the group would be viewed as paraphyletic and, therefore, unsatisfactory. An examination of McGuffin's text, however, suggests that he perceived the group as more phylogenetically coherent. McGuffin restricted his study to Larentiinae of North America and included just the two genera *Hydrelia* and *Venusia*. He suggested that larval morphology demonstrated a close relationship between the two genera. The spinneret was found to be much longer than the labial palpi, and the thoracic claw was described as being almost straight, with the angle of the notch being acute. How far these observations pertain to the Asthenini more widely, and whether the characters are apomorphic, remain unknown. Larvae of most Asthenini are unknown, and our work has been based, inevitably, on adult morphology.

McGuffin's classification was preceded by that of Forbes (1948), which was also restricted to North American Asthenini. Forbes included three genera, *Hydrelia*, *Venusia* and *Trichodezia*, but apart from some comments in a 'table of tribes', he did not give a convincing definition of the tribe. He seems to have based his concept of the group largely on the existence of extended chaetosemata. We have excluded *Trichodezia* from Asthenini, for it has a well-developed uncus.

A list of family-group names of Larentiinae was compiled by Holloway (1997) in his work on the moths of Borneo. Holloway did not distinguish the Asthenini from the Eupitheciini because some of the genera that had been added to the group by McQuillan & Edwards (*in* Nielsen, Edwards & Rangsi, 1996) lack an extended sacculus, a character used to define the tribe by Pierce (1914), and because he considered the distinction between Asthenini and Eupitheciini to be weakly supported.

Chinese species of Larentiinae were treated by Xue & Zhu (1999) in their extensive survey of the subfamily. Many of the genera included in the present paper were discussed there, but tribal definitions were not provided.

## Structures of taxonomic note

*Uncus, tegumen and anal tube.* Typically in Lepidoptera, the anal tube is attached to the tegumen posteriorly and, where an uncus is present, the anal tube diverges at the point at which it articulates with the tegumen. In his description of the Asthenini (as Astheninae), Pierce (1914: 38) stated that 'the uncus is weak and entirely attached to the anal tube which bears a thickened subscaphium'. In most species, the uncus (a sclerite articulated with the posterior end of the tegumen) appears to be absent. Occasionally (as in *Eschatarchia*) a triangular vestige is apparent. In the

light of this observation, it is difficult to understand as a general observation Pierce's statement that the uncus is attached to the anal tube in Asthenini. However, where a vestige is present, it is indeed fused entirely with the dorsal surface of the anal tube.

*Sclerotizations associated with the diaphragma and anellus.* Although the sclerotizations of this region are complex within the Larentiinae and much used in the taxonomy of the subfamily, little has been written on the homologies of the various components. There is a real need for a comparative study of the area across the group. The important sclerotizations in the Asthenini and Eupitheciini are the labides, the transtillae and the juxta.

Each *transtillae* extends from the base of each valva dorsally. In most Asthenini (and, indeed, across the Lepidoptera) these paired structures meet medially and represent the dorsal-most sclerotization of the diaphragm. The transtillae are often not very conspicuous, particularly where the genitalia are mounted ventrally.

The *labides* were said by Pierce (1914) to spring from the points at which the transtillae unite with the costae of the valvae. This is a somewhat narrow view, since there are a number of rod-like structures in Larentiinae that may or may not be homologous with these structures in Asthenini – in, for example, Eupitheciini. Of particular interest in this paper is the comparison between the Eupitheciini and the Asthenini. In Asthenini, the labides usually arise from the base of the valvae, as noted by Pierce, and extend variously (see generic treatments, below). In *Eupithecia*, it does not seem to have been stated that labides homologous to those in Asthenini actually exist. However, observations on the genus *Poecilasthena* have shed some light on this matter (see below).

In *Eupithecia* the juxta, possibly with other sclerotizations of the diaphragm, is distinctive being shaped like an hourglass (see, e.g., illustrations in Holloway, 1997). The anterior end of each member of a pair of ventral arms lateral to the juxta curve inwards to the medial constriction of the juxta. Structures that appear to be articulated with the posterior ends of the arms meet medially to form what are possible homologues of the asthenine labides.

In *Poecilasthena* although the juxta is flask-shaped, not hourglass-shaped, there occurs what appears to be the homologue of the ventral arms in *Eupithecia*. Each arm continues anteriorly into a somewhat expanded and free membranous structure, which is not united medially with its opposite member. We consider that the arms and their membranous expansions are labides, even though they are not united with the base of the valvae as they are in typical Asthenini. Support for this view comes from observations on *P. paucilinea*, in which what we take to be the ventral arms *do* extend



from the bases of the valvae, and are more strongly sclerotized than normal and less arm-like. Females of both *Poecilasthena* and *Eupithecia* bear a small colliculum within a narrow ductus bursae. Other features of *Poecilasthena*, are, however, much closer to the Asthenini condition, notably the shape of the juxta and the signum. Under this interpretation, the ventral arms in *Eupithecia* are also part of the labides.

Our study of *Poecilasthena* gives further support to the view that the taxonomic association of the Asthenini and Eupitheciini is close. Indeed, like Holloway (1997), who included *Parasthena*, *Poecilasthena*, *Polynesia*, *Eois*, and *Pseudopolynesia* in a broad definition of Eupitheciini, we harbour some doubts that the tribes are distinct.

**Corpus bursae.** The typical asthenine signum is composed of a dense accumulation of denticles or spines radiating, on both sides, from a central line or ridge formed from the bases of the denticles or spines. An example of a signum showing a combination of denticles, radiating spines and a central ridge is illustrated in Fig. 295 (*Poecilasthena dimorpha*). The signum is usually elongated, but sometimes round or elliptical. In some Asthenini it takes the form of a narrow band. The signum in Asthenini is distinctive, providing, probably, the best defining character for the group. In *Hydrelia*, besides the main signum, a smaller second signum occurs, which is also formed from denticles arranged in the same way. In *Palpoctenidia* the spines are stouter than usual, but the radiating arrangement is the same. In the non-asthenine genus *Pseudostegania* Butler, a signum composed of numerous denticles occurs. However, the arrangement of these differs from the condition in Asthenini for the denticles do not radiate from a central line. The signa in *Sterrhochaeta* Prout also differ. (The type species of this genus, *S. fulgurata* (Warren) is illustrated in Fig. 188.)

In a number of species of Asthenini, the corpus bursae is partly or wholly covered with denticles. Often these denticles are minute, but in some species they are prominent (e.g., as in Fig. 277) with strengthening ridges. These denticles are frequently encountered in *Eupithecia*, but they occur in other genera of Larentiinae such as *Horisme* (see, for example, in Holloway, 1997), in some Sterrhinae and outside the Geometridae. In the Asthenini, these denticles do not occur across individual genera, but are present sometimes in just one species. The taxonomic distribution of these denticles, therefore, renders it difficult to draw wide phylogenetic conclusions from their presence. Nevertheless, when other characters shared by *Eupithecia* and Asthenini are taken into account, the presence of these denticles lends further support for a close association of the taxa.

**Venation** (Figs 189–192). In most Asthenini the forewing areole is single, but examples of a double areole occur (as in most *Venusia*, in *Bilastina*, and in *Poecilasthena*), and in '*Chalyboclydon*' *flexilinea* and *Palpoctenidia* the areole is absent. Differences between genera also occur in the point at which veins  $R_1$  and  $R_5$  diverge from the common stem in the forewing. In some genera,  $R_1$  diverges before (proximal to) the divergence point of  $R_5$ , whereas in others the opposite condition is encountered. In the hindwing, the discocellulars are either markedly angled (biangulate condition) or not so modified. The position of vein  $M_2$  in relation to veins  $M_1$  and  $M_3$ , and whether or not  $M_3$  is united at its base (stalked) with  $CuA_1$  are other venational features found to have some taxonomic value.

## Layout

A list of species included in each genus of Asthenini is presented with the name of the original genus, if differing from that current, provided in brackets. We have also listed species belonging to some of the non-asthenine genera that are discussed at the end of this paper. References to species listed have not been cited as they are to be found in Scoble (1999), but they are given for type species, which are detailed under the description for each genus.

## Depositories of Material

ANIC	The Australian National Collection, Canberra, Australia
BMNH	The Natural History Museum, London, UK
IZAS	Institute of Zoology, Academia Sinica, Beijing, China

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## TRIBE ASTHENINI

Astheninae Warren, 1893: 362.

**MOTH** (Figs 1–177). Generally fairly small compared with other Larentiinae. Body typically slender. **Head.**



Frons often broad and protuberant, but sometimes neither broad nor protuberant. Labial palpi narrow and short, generally not pointed or only weakly pointed. Antenna of male ciliate or smooth, sometimes bipectinate, seldom unipectinate. *Legs* simple; tibial spurs 0–2–4.

*Wings* generally pale with dark waved transverse lines running from costa of forewing to hind margin of hindwing. Venation as in Figs 189–192. Forewing: usually with areole single, sometimes double, occasionally absent; if areole is absent, vein R never connected to Sc, in contrast with some Eupitheciini. Hindwing: hind margin generally narrow; Sc+R<sub>1</sub> diverging from common stem 3/4 of way along cell; Rs sharing common stem with M<sub>1</sub>; 3A absent.

MALE GENITALIA (Figs 193–220; 226–253). Uncus absent or strongly reduced. Anal tube united with tegumen (and uncus vestige, if present); subscaphium often present. Vinculum: extended into broad or narrow saccus. Labides fairly membranous, apex setose. Juxta often broad at base, tapering – sometimes to a slender process posteriorly. Valva: broad, setose, with setae pointing towards base of costa; sacculus usually bearing sclerotized extension, extension sometimes not developed. Anellus: labides present, varying from narrow to broad, or absent; juxta broad or narrow. Aedeagus: narrow; vesica with various sclerotizations.

FEMALE GENITALIA (Figs 268–292). Ductus bursae of constant width, often sclerotized extensively; broader than in *Eois*. Corpus bursae seldom densely denticulate, unlike the condition in Eupitheciini and Trichopterigini, if denticles occur, they do not completely cover corpus bursae; signum distinctive, composed of denticles or spines radiating from central line or ridge formed by their bases; usually somewhat elongated, sometimes in form of narrow band, sometimes almost round; second smaller signum, of same basic composition, sometimes present.

DIAGNOSIS. Asthenines are best distinguished from other Larentiinae by the presence of the distinctive signum. Asthenini share some characters with the tribe Eupitheciini. The combination of extremely narrow and short labial palpi, a generally broad and protuberant frons and relatively broad wings are typical external features of Asthenini. The best diagnostic combination of characters of the genitalia includes the reduced or lost uncus; labides narrow, rather than lobe- or spoon-shaped, and seldom united; and the corpus bursae with a signum (or signa) composed of radiating denticles or spines.

DISTRIBUTION. Asthenini are represented in all the major biogeographical regions. The tribe is at its most diverse in east Asia, but is poorly represented in the Afrotropics and Neotropics.

TAXA INCLUDED. Eighteen genera are included and the species ‘*Chalyboclydon*’ *flexilinea* Warren is unplaced. Two hundred and twenty-seven species group taxa (species and subspecies) are identified as belonging to the tribe.

MATERIAL EXAMINED. About 2900 specimens have been studied: 2558 from the BMNH, and 350 from IZAS. Approximately 400 genitalia slides from the BMNH collection were examined.

### Checklist of the genera of Asthenini

*Asthena* Hübner, [1825] 1816  
*Hydrelia* Hübner [1825] 1816  
*Agnibesa* Moore, 1888  
*Euchoeca* Hübner, [1823] 1816  
*Epicyme* Meyrick, 1885  
*Eschatarchia* Warren, 1894  
‘*Chalyboclydon*’ *flexilinea* Warren, 1898  
*Palpoctenidia* Prout, 1930  
*Asthenotricha* Warren, 1899  
*Venusia* Curtis, 1839  
*Nomenia* Pearsall, 1905 **gen. rev.**  
*Hastina* Moore, 1888  
*Macrohastina* Inoue, 1982  
*Bihastina* Prout, 1916  
*Leucoctenorrhoe* Warren, 1904  
*Parasthena* Warren, 1902  
*Poecilasthena* Warren, 1894  
*Polynesia* Swinhoe, 1892  
*Anydrelia* Prout, 1938

### Genera examined and excluded from Asthenini

*Minoa* Treitschke, 1825  
*Chalyboclydon* Warren, 1893  
*Cleptocosmia* Warren, 1896  
*Eois* Hübner, 1818  
*Pseudopolynesia* Holloway, 1997  
*Chaetolopha* Warren, 1899  
*Trichodezia* Warren, 1895

### Key to Genera

- Forewing usually with R<sub>1</sub> diverging from stem *distal* to divergence point of R<sub>5</sub>; if R<sub>1</sub> does not diverge in this way, then either cell of hindwing is no longer than 1/3 of length of hindwing, or discocellulars of forewing are strongly biangulate ..... 2
 

Forewing with R<sub>1</sub> diverging from stem *proximal* to divergence point of R<sub>5</sub>, or united only briefly, or diverging at same point; hindwing cell extending almost to half length of hindwing or beyond; discocellulars of forewing never biangulate ..... 12
- Cell of hindwing not longer than 1/3 length of hindwing ..... 3
 

Cell of hindwing close to or exceeding half length of hindwing ..... 4

3. Forewing with areole absent ..... *Chalyboclydon flexilinea*  
Forewing with areole single ..... *Polynesia*
4. Discocellulars strongly biangulate on forewing; male antenna unipectinate, with short pectinations ..... *Nomenia*  
Discocellulars not biangulate on forewing, male antenna never unipectinate ..... 5
5. Antenna in both sexes bipectinate ..... *Leucoctenorrhoe*  
Antenna not bipectinate in either sex ..... 6
6. Discocellulars of hindwing strongly biangulate; male hindwing with hind margin expanded into very large flap which is folded beneath wing and almost reaches to middle of cell ..... *Anydrelia*  
Discocellulars of hindwing not biangulate; male hindwing without this modified flap ..... 7
7. Termen of hindwing with sharp angle, turned upwards at  $M_3$ ; both wings with fuscous line near the distal margins, that of forewing bent strongly, touching the distal margin medially and enclosing pale marginal patches on upper and lower surfaces ..... *Eschatarchia*  
Termen of hindwing not angled as above; wings lacking fuscous line near distal margins ..... 8
8. Termen of forewing dentate, deeply excavated between  $R_5$  and  $M_3$  ..... 9  
Termen of forewing gently curved, lacking tooth or deep excavation ..... 10
9. Frons prominent, broad and rounded; wings dark or pale brown with yellowish lines; vein  $M_3$  never stalked with  $CuA_1$  ..... *Hastita*  
Frons not prominent, nor broad nor rounded; apical area of forewing and distal part of hindwing partly pure white, proximal half of hindwing pale yellowish; vein  $M_3$  sometimes stalked with  $CuA_1$  ..... *Macrohastita*
10. Wings pale greyish to white; hindwing with termen excavated between  $M_1$  and  $M_3$ , points at  $M_1$  and  $M_3$  sharp ..... 11  
Wings yellowish brown; hindwing not excavated as described above and lacking point at  $M_1$ , termen angled at  $M_3$  but blunt, not sharp ..... *Euchoeca*
11. Small (length of forewing not longer than 10 mm); wings pale greyish, lacking visible white ground colour; male forewing with small anal lobe, male hindwing with posterior margin folded under wing ..... *Parasthena*  
Large (length of forewing not less than 13 mm); white ground colour of wings always visible; male wings lacking such modifications ..... *Agnibesa*
12. Forewing lacking areole; male antenna bipectinate ..... *Palpoctenidia*  
Forewing with 1 or 2 areoles; male antenna not bipectinate ..... 13
13. Discocellulars of hindwing biangulate ..... 14  
Discocellulars of hindwing not biangulate ..... 15
14. Forewing with areole single ..... *Venusia*  
Forewing with areole double ..... *Poecilasthena* (main group and *anthodes* group)
15. Termen of hindwing deeply dentate ..... *Bihastina*  
Termen of hindwing not dentate, smooth or slightly waved, or angled at middle ..... 16
16. Forewing with areole usually double, occasionally single; if areole single, wings white; if areole double, forewing with antemedian, median and double postmedian lines dark brown and running straight below costa; vesica with bundle of cornuti on vesica ..... 17  
Forewing with areole single, markings not as above; vesica without cornuti ..... 18
17. Ground colour of wings pale grey; termen of hindwing weakly dentate at  $M_1$  and  $M_3$ , excavated between teeth; male genitalia with coremata; vesica lacking cornuti; proximal edge of sternum A8 of male modified to form 'W' shape ..... *Poecilasthena (papuensis)* group  
Ground colour of wings white, termen of hindwing weakly angled medially, seldom dentate and excavated; male genitalia lacking coremata; vesica with cornuti present; sternum A8 unmodified ..... *Asthena*
18. Costa of forewing strongly expanded proximally, or male hindwing with proximal half of costa strongly broadened; hair tuft present on upper surface of costa close to base; anastomosis of  $Sc+R_1$  with  $Rs$  distinctly less than 3/4 length of hindwing; uncus/tegumen triangular and pointed; labides finger-like, extending to half length of tegumen; anal papillae nearly smooth, distal half of ductus bursae 'Y' shaped ..... 19  
Costa of forewing straight or only very weakly broadened near base, male hindwing lacking hair tuft; anastomosis of  $Sc+R_1$  with  $Rs$  reaching beyond 3/4 length of hindwing; genitalia variable, but not as described above ..... 20
19. Male hindwing with hair tuft on upper surface of costa close to base; proximal half of hindwing costa strongly broadened ..... *Asthenotricha (dentatissima)* group  
Male hindwing lacking hair tuft; hindwing costa not broadened. .... *Asthenotricha (argyridia)* group
20. Frons not broad and protuberant; valva with apex fringed with hair-like scales, which are long and expanded at tips; posterior half of ductus bursae membranous, signum elliptical, with long spines radiating peripherally from denticulate core ..... *Epicyme*  
Frons generally broad and distinctly protuberant; if not like this, then genitalia of both sexes different from above ..... *Hydrelia*

### *Asthena* Hübner, [1825] 1816

(Figs 1–15; 189; 193–195; 226–228; 268, 269.)

*Asthena* Hübner, [1825] 1816: 310. Type species: *Geometra candidata* [Denis & Schifferrmüller], 1775: 110 (a junior synonym of *Asthena albulata* Hufnagel).

*Roessleria* Breyer, 1869: xix. Type species: *Geometra candidata* [Denis & Schiffermüller], 1775: 110.

**MOTH** (1–15). *Head*. Frons neither broad nor protuberant. Labial palpi very slender and short, generally not extending beyond front of head. Antenna of male serrate, with hair tuft in type species and *nymphaeata*, or smooth. *Wings*. White or off-white in most species with pale brown, weak fasciae; appearance pale brown in e.g., *plenaria*; mottled brown in *albosignata*; fasciae bold in *opedogramma* and *tchrachraia*. Venation (Fig. 189) with cell on both wings extending slightly less than half length of wing; forewing with areole usually double, sometimes single; vein R<sub>1</sub> arising proximal to apex of second areole; R<sub>5</sub> arising from apex of second areole or united for short distance with R<sub>2+4</sub>; hindwing with discocellulars slightly curved, not biangulate, distal margin slightly angled at M<sub>3</sub>.

**MALE GENITALIA** (Figs 193–195; 226–228). Labides in form of well-developed, straight arms, sometimes reduced to very short processes, sometimes absent. Juxta broad, extending anteriorly into a narrow process so that whole appears flask-shaped. Valva: sacculus usually with distinctive double projection of a longer, narrow spine-like process and a shorter, broader process with short hairs at apex, notably complex in *amurensis*; costa margin weakly convex. Aedeagus: vesica with spine-like cornuti. Abdomen: sternum A8 unmodified.

**FEMALE GENITALIA** (Figs 268,269). Ductus bursae sclerotized throughout length except for very short membranous section. Corpus bursae: signum generally short and broad, composed of radiating denticles; spinose patch often occurring in addition to discrete signum; surface of corpus often partly covered with minute denticles.

**DIAGNOSIS.** Most species of *Asthen*a may be distinguished from species in other asthenine genera by the white ground colour of the wings, but this feature is not universal within the genus. Both *anseraria* and *lassa* resemble superficially certain *Scopula* species (Sterrhinae). Distinguishing characters include the fact that the frons is neither broadened nor protuberant, and the unstalked condition of vein R<sub>1</sub> of the forewing. The most distinctive character is the complex form of the sacculus with its two projections. The presence of cornuti on the vesica of *Asthen*a distinguishes it from *Hydrelia* where these structures are absent.

**DISTRIBUTION.** Across the Palaearctic region and in India.

**SPECIES INCLUDED.** Twenty-two described. There is an undescribed species from Burma represented by a single, worn male specimen in the BMNH. Genitalia examined: *A. albosignata* (male, female), *albulata* (male, female), *amurensis* (male), *anseraria anseraria*

(male, female), *anseraria corculina* (male, female), *hamadryas* (male), *lassa* (male), *nymphaeata* (male, female), *opedogramma* (male, female), *plenaria* (male), *sachaliensis* (female), *melanosticta* (male, female), *octomaculata* (female), *tchrachraia* (female), *undulata* (male, female).

*Asthen*a *albidaria* (Leech, 1897)

China.

*Asthen*a *albosignata* (Moore, 1888) (*Idaea*?)

India, China, Kashmir.

*Asthen*a *albulata* (Hufnagel, 1767) (*Phalaena*)

*Geometra candidata* [Denis & Schiffermüller], 1775

Widespread in the Palaearctic.

*Asthen*a *amurensis* (Staudinger, 1897)

*Cidaria candidata amurensis* Staudinger, 1897.

*Asthen*a *hamadryas* Inoue, 1976. **Syn. n.**

Russia, Japan, Korea.

*Asthen*a *anseraria anseraria* (Herrich-Schäffer, 1855) (*Arrhostis*?)

*Cidaria soldaria* Turati, 1879.

Widespread in the Palaearctic.

*Asthen*a *anseraria corculina* Butler, 1878

Japan, China.

*Asthen*a *lactularia* (Herrich-Schäffer, 1855) (*Hydrelia*)

? *albeolata* Rambur, 1866

*Asthen*a *nymphulata* Guenée, [1858]

France, Spain.

*Asthen*a *lassa* Prout, 1926

Burma.

*Asthen*a *livida* (Warren, 1896) **comb. n.** (*Autallacta*)

India.

**REMARKS.** This species differs from others in *Asthen*a, and its position in the genus is uncertain. The moth is uniformly dark brown rather than white or otherwise pale. Furthermore, the cell on both fore- and hindwing is very short – on the hindwing it is only 1/3 the length of the wing. The free section of vein R<sub>1</sub> of the forewing is unusually long. The male genitalia are



unusual in having an elongated tegumen and narrow, but well developed, curved labides. Both these characters are reminiscent of the condition in *Polynesia*, but the wing pattern is completely different and the saccus is not truncated as in that genus.

***Asthena melanosticta* Wehrli, 1924**

China.

***Asthena nymphaeata* (Staudinger, 1897)  
(*Cidaria*)**

*Acidalia ainoica* Matsumura, 1927.

Russia, Japan, Korea, China.

***Asthena ochrifasciaria* Leech, 1897**

Japan.

***Asthena octomaculata* (Leech, 1897)**

China, Japan.

***Asthena opedogramma* (Prout, 1926) comb.  
n. (*Hydrelia*)**

Burma, China.

REMARKS. This species and *tchratraria* Oberthür were treated as members of *Hydrelia* by Prout (1926, 1934–39) probably because Prout thought that the areole in the forewing was always single in that genus, whereas in *Asthena* it is double. Having checked all specimens of both species in the BMNH and IZAS, we discovered that the number of areoles varies. In some specimens just a single areole is, indeed, present. But in others, the areole is double on both the right and the left forewing, and in yet others it is double on just the right or the left fore wing. When the areole is double, the first (more proximal) areole is very small. The two species share most characters of typical *Asthena* other than the presence, sometimes, of a single areole. The frons is only weakly protuberant, cornuti are present, and the signum is short and broad, as in many *Asthena* species. Unique to the species is the presence of well-sclerotized spines on the lateral parts of the juxta, labides and terminal half of the sacculus.

***Asthena plenaria* (Leech, 1897) (*Hydrelia*)**

China.

***Asthena sachaliensis* (Matsumura, 1925)**

Japan, Russia.

***Asthena tchratraria* (Oberthür, 1893)  
(*Acidalia*)**

Burma, China.

(See Remarks under *opedogramma* Prout.)

***Asthena undulata* (Wileman, 1915)**

(*Leucoctenorrhoe*)

China.

**The *albifera* group**

The following four species have a single areole, but the genitalia are very similar to *Asthena* notably in the shapes of the sacculus, juxta, and vinculum. Additional spining occurs on the corpus bursae in addition to the denticulate signum.

The *albifera* group differs from *Hydrelia* in having a pure white ground colour, a narrow and non-protuberant frons, and a bundle of cornuti on the vesica of the aedeagus. All of these characters correspond to those in *Asthena*.

Genitalia examined: *albifera* (male, female), *chionata* (male), *percandidata* (male, female).

***Asthena albifera* (Walker, 1866) (*Acidalia*?)**

*Acidalia albogilvaria* Morrison, 1874

*Corycia triseriata* Packard, 1874

North America.

***Asthena brunneifasciata* (Packard, 1876)**

Canada.

***Asthena chionata* (Lederer, 1870) (*Cidaria*)**

*Cidaria quadripunctata* Biernert, [1871]

Iran.

***Asthena percandidata* (Christoph, 1893)  
(*Cidaria*)**

*Cidaria anseraria candidissima* Staudinger, 1897

Transcaucasus, Central Asia.

**Species excluded**

The following species, which have been associated with *Asthena* in the past, belong neither to that genus, nor to the tribe Asthenini. Genitalia examined: *argentipuncta* (male, female), *argyrorrhyses* (male, female), *aurantiaca* (male), *eurychora* (female), *straminearia* (male, female), *yargougaria* (male).

**'*Asthena*' *argentipuncta* Warren, 1906  
(*Asthena*)**

Papua New Guinea.

**'*Asthena*' *argyrorrhyses* Prout, 1916  
(*Asthena*)**

Irian Jaya.

*'Asthena' aurantiaca* Prout, 1926 (*Asthena*)  
Irian Jaya.

*'Asthena' distinctaria* (Leech, 1897)  
(*Hydrelia*)  
China.

*'Asthena' eurychora* Prout, 1928 (*Asthena*)  
Western Samoa.

*'Asthena' straminearia* (Leech, 1897)  
(*Hydrelia*)  
China.

*'Asthena' subditaria* Warren, 1906 (*Asthena*)  
Papua New Guinea.

*'Asthena' yargongaria* Oberthür, 1916  
(*Asthena*)  
China.

*Hydrelia* Hübner, [1825] 1816  
(Figs 16–68; 196, 197; 229, 230; 270.)

*Hydrelia* Hübner, [1825] 1816: 322. Type species:  
*Geometra sylvata* [Denis & Schiffermüller], 1775:  
109.

*Autallacta* Warren, 1893: 365. Type species: *Timandra*  
*subobliquaria* Moore, 1868: 644.

**MOTH** (Figs 16–68). *Head*. Frons broad and prominent. Labial palpi very slender and short, generally not extending beyond front of head. Antenna weakly serrate, ciliated in male, simple in female. *Wings*. Rather narrower than in *Asthena* and *Venusia*. Colour variable: most species grey-brown with weak transverse band and lines; some species ochreous; strong transverse line or lines in a few species; some species with yellow ground colour; a few species with wings dark grey-brown with contrasting white markings. Forewing with single areole, varying in size among species; vein  $R_1$  diverging from common stem before (proximal to) point of divergence of  $R_5$ . Hindwing: termen sometimes angled medially; discocellulars not biangulate; vein  $M_3$  usually not stalked with  $CuA_1$ , but stalked on both wings in a few species.

**MALE GENITALIA** (Figs 196, 197, 229, 230). Labides in form of a pair of long, curved, spine-like processes in type species and relatives; processes smaller and membranous in other species or united with opposite member. Juxta variable; narrow and extended, plate-like or reduced to small sclerite between the bases of the valvae. Valva usually narrows to apex; sacculus typically extended into a thumb-like projection, some-

times sacculus not extended. Aedeagus: vesica lacking cornuti. Sternum A8 unmodified.

**FEMALE GENITALIA** (Fig. 270). Anal papillae extended to form more attenuated ovipositor in type species and relatives compared with other species, where ovipositor is much flatter. Ductus bursae: antrum sclerotized throughout apart from a narrow membranous break. Corpus bursae often with numerous minute denticles; signum typically elongated, composed of radiating denticles; many species with a small additional signum, similarly composed, at posterior end of corpus; surface of corpus partly or wholly covered with minute denticles.

**DIAGNOSIS.** Close to *Asthena*, *Venusia* and *Agnibesa*. *Hydrelia* differs from *Asthena* in having a generally broad and strongly prominent frons, in the ground colour of the wings seldom being pure white, in having a single areole on the forewing, in lacking cornuti on the aedeagus, and in having a signum typically elongated and often band-like. *Hydrelia* lacks biangulate discocellulars on the hindwing and in this way differs from *Venusia*. It may be distinguished from *Agnibesa* by several features (see Diagnosis of *Agnibesa*).

**DISTRIBUTION.** Palaearctic, Nearctic and Oriental Regions.

**REMARKS.** The integrity of *Hydrelia* as a monophyletic entity remains in doubt, there being no very convincing apomorphy. Wing shape and pattern assist recognition of the genus as it stands now. The male genitalia of the type species *H. sylvata* (Fig. 197), and its relatives differ from those of other species (e.g., as in Fig. 196) and it may eventually be necessary to restrict the genus *Hydrelia* to this group. We do not make such a restriction here since *Hydrelia* is sufficiently coherent and well known to make it counterproductive to split it until a full species-level revisionary study has been undertaken.

Preliminary study has identified several species groups, although we do not treat them as formal taxa at this stage, and nor are the suggested divisions comprehensive.

The *sylvata* group. The type species of *Hydrelia*, *H. sylvata* (D. & S.), which is similar to the Nearctic species *H. lucata* (Guenée), bears a pair of long, narrow and curved labides. The juxta of these species unites, anteriorly, with a long and narrow dorsal sclerite of the diaphragma. The labides are broader and straight in *flammeolaria* (Hufnagel). That *sylvata* and *flammeolaria*, both European species, are closely related is evident from the relatively attenuated ovipositor in each and in the similar shape of the valva. The larval foodplant range overlaps, in that both species occur on *Alnus* (Betulaceae). The Nearctic species *condensata*, *inornata* and *lucata* also belong to this

group. Oriental species that appear to belong with *sylvata* and its relatives include *aurantiaca*, *rufigrisea*, *sericea*, *nepaleusis*, *rubrilinea*, *?lineata*, *?laetivirga*, *rhodoptera*, *marginepunctata*, *binotata*, *rubricosta*, *sanguinipaga*, *nisaria*. The following species, which exhibit similarities in wing shape and markings may also be associated, or, may form a separate group: *sericea*, *rubrilinea*, *lineata*, *laetivirga*.

The *aggerata* group. The largest of these species groups, which is Oriental in distribution (mainly Chinese), is a monophyletic assemblage including *aggerata* and its relatives and is defined by several characters. The labides seem to be absent and should not be confused with a pair of setose, membranous projections from the diaphragma. An additional feature, giving some further possible support to the grouping is that the valva is broad with the sacculus projected in such a way as to form a wide, c. 90° angle, with the costa. Unlike the condition in the *sylvata* group, the ovipositor is short and not pointed. Species belonging here include: *aggerata*, *aurantiaca*, *bella*, *bicolorata*, *conspicuarua*, *crocearia*, *ornata*, *pavonica*, *rubriveua* and *subobliquaria*.

The *ungularia* group (Oriental) has a rounded valva that lacks a projection of the sacculus. The dorsal sclerite of the diaphragma is absent. Species identified: *latsaria*, *microptera*, *subtestacea* and *ungularia*.

The valva of *H. impleta* Prout differs in shape.

In *subobliquaria* (Moore) from Bengal, the valva resembles more closely that of the *sylvata* group than that of *aggerata* and its relatives, but the labides, although distinct, are shorter and membranous.

**SPECIES INCLUDED.** 61 species. Genitalia examined: *aggerata* (male), *aurantiaca* (male, female), *bella* (male, female), *bicolorata* (male, female), *biuotata* (male, female), *condensata* (female), *conspicuarua* (male, female), *controversa* (male, female), *crocearia* (male, female), *elegans* (female), *enisaria* (male), *fuscocastanea* (male, female), *impleta* (male), *iuornata* (female), *laetivirga* (male), *latsaria* (male), *lineata* (male, female), *lucata* (female), *marginepunctata* (male, female), *microptera* (male, female), *nepaleusis* (male, female), *oruata* (male), *pavonica* (male), *rubricosta* (male), *rubrilinea* (male, female), *rubriveua* (male, female), *rufinota* (female), *sericea* *sericea* (male, female), *subobliquaria* (male, female), *rhodoptera* (male, female), *speciosa* (male), *sanguinipaga* (male), *subcingulata* (male), *subtestacea* (male), *sylvata* (male), *undularia* (male).

### ***Hydrelia aggerata* Prout, 1938**

China.

### ***Hydrelia arizana* (Wileman, 1911) (*Acidalia*)**

China.

### ***Hydrelia aurantiaca* Hampson, 1903**

China, Nepal.

### ***Hydrelia bella* (Wileman, 1916) sp. rev. (*Venusia*)**

China.

**REMARKS.** The species was listed as a synonym of *bicolorata* (Moore) in Scoble (1999), but the genitalia are distinct and it is treated here as a separate species. Male with valva much narrower than in *bicolorata* (Moore), shape intermediate between that species and *aggerata* Prout from W. China. In the female, the signum in *bella* is possibly larger than that in *bicolorata*.

Wileman (1916: 97) cited the type material as: 'A male specimen from Arizan (7300 ft.), September 27th, 1906, a female specimen from Arizan, August, 1908; and another from Rantaizan, May, 1909 (7500).' The 'male' syntype is, in fact, a female, and there is no specimen of the male sex in the type series.

### ***Hydrelia bicauliata* Prout, 1914**

Japan, China.

### ***Hydrelia bicolorata* (Moore, 1868) (*Hyria*)**

*Eupithecia ferruginaria* Moore, 1868.

China, India, Sikkim.

### ***Hydrelia binotata* Inoue, 1987**

China, Nepal.

### ***Hydrelia castaria* (Leech, 1897) (*Plenmyria*)**

China.

### ***Hydrelia cingulata* Hampson, 1896**

China.

### ***Hydrelia condensata* (Walker, 1862) (*Melanthia*)**

U.S.A.

### ***Hydrelia conspicuarua* (Leech, 1897) (*Cambogia*)**

China.

**REMARKS.** This species and *H. elegans* (Inoue) were long assigned to *Palpoctenidia*. Both species were described from just a single female holotype. The discovery of a male specimen of *couspicuarua* has enabled us to examine the genitalia of that sex, which shows that it belongs to *Hydrelia*. Furthermore, there is a single small areole on the forewing in both



*conspicuaris* and *elegans*, which is absent in most specimens of the only species of *Palpoctenidia*.

***Hydrelia controversa* Inoue, 1982**

Nepal.

***Hydrelia crocearia* Hampson, 1896**

China.

***Hydrelia elegans* (Inoue, 1982) comb. n.**

Nepal.

***Hydrelia enisaria* Prout, 1926**

Burma

***Hydrelia flammeolaria* (Hufnagel, 1767)  
(*Phalaena*)**

*Phalaena centrata* Fabricius, [1776].

*Asthena chibiana* Matsumura, 1925.

*Geometra flavicata* Thunberg, 1784.

*Phalaena flavostrigata* Donovan, 1806.

*Geometra luteata* [Denis & Schiffermüller], 1775

*Phalaena sinuosata* Giorna, 1791

Widely distributed across the Palaearctic from western Europe to Japan.

***Hydrelia flammulata* (Bastelberger, 1911)  
(*Cambogia*)**

China.

***Hydrelia flavilinea* (Warren, 1893)  
(*Cambogia*)**

Sikkim, China.

***Hydrelia fuscocastanea* Inoue, 1982**

Nepal.

***Hydrelia gracilipennis* Inoue, 1982**

Japan.

***Hydrelia impleta* Prout, 1938**

China.

***Hydrelia inornata* (Hulst, 1896)**

*Tephroclystis inornata* Hulst, 1896.

*Euchoeca exhumata* Pearsall, 1906.

U.S.A.

***Hydrelia laetivirga* Prout, 1934**

China.

***Hydrelia latsaria* (Oberthür, 1893) (*Acidalia*)**

China.

***Hydrelia leucogramma* Wehrli, 1931**

China.

***Hydrelia lineata* (Warren, 1893) (*Autallacta*)**

Sikkim, China, Nepal.

***Hydrelia lucata* (Guenée, [1858]) (*Asthena*)**

Canada.

***Hydrelia luteosparsata* Sterneck, 1928**

China.

***Hydrelia marginepunctata* Warren, 1893**

Sikkim, China, Nepal.

***Hydrelia microptera* Inoue, 1987**

Nepal, China.

***Hydrelia musculata* (Staudinger, 1897)  
(*Cidaria*)**

Russia.

***Hydrelia nepalensis* Inoue, 1987**

Nepal, China.

***Hydrelia nisaria* (Christoph, 1881) (*Acidalia*)**

*Hydrelia nisaria japonica* Inoue, 1944

Russia, China, Japan, Korea.

***Hydrelia ochrearia* Leech, 1897**

China.

***Hydrelia ornata* (Moore, 1868) (*Hyria*)**

India, Sikkim, Nepal, China.

***Hydrelia parvularia* (Leech, 1897) (*Plemyria*)**

China.

***Hydrelia parvulata* (Staudinger, 1897)  
(*Cidaria*)**

Russia.

***Hydrelia pavonica* Xue, 1999**

China.

***Hydrelia rhodoptera* Hampson, 1895**

Sikkim, China.

***Hydrelia rubraria* Hampson, 1903**

China (Tibet).

***Hydrelia rubricosta* Inoue, 1892**

Nepal, China.

***Hydrelia rubrilinea* Inoue, 1987**

Nepal, China.

***Hydrelia rubrivena* Wileman, 1911**

China (Taiwan).

REMARKS. The abdomen of the type of *rubraria* Hampson is missing, so we have been unable to confirm the currently accepted identity as valid. *H. rubrivena* may be a junior synonym of *aurantiaca* Hampson. The wing markings are similar but the colour differs between the two species. The male genitalia of both species are also quite similar. In the female, the corpus bursae is smaller in *rubrivena* and the signum shorter and broader. *H. rubraria* has the same markings as both *rubrivena* and *aurantiaca*.

***Hydrelia rufigrisea* (Warren, 1893)***(Asthenia?)*

Sikkim, China.

***Hydrelia rufiuota* Hampson, 1896**

India, China.

***Hydrelia sanguiflua* Hampson, 1896**

China.

***Hydrelia sanguiniplaga* Swinhoe, 1902**

China, Burma.

***Hydrelia scotozona* Yazaki, 1995**

Nepal.

***Hydrelia sericea sericea* (Butler, 1880)***(Noreia)*

China, Nepal, N. E. Himalaya.

***Hydrelia sericea pampesia* Prout, 1938**

Kashmir.

***Hydrelia shioyana* (Matsumura, 1927)***(Acidalia)**Hydrelia adesma* Prout, 1930.

Japan.

***Hydrelia speciosa* Inoue, 1992**

Nepal.

***Hydrelia subcingulata* Inoue, 1987**

Nepal, China.

***Hydrelia sublatsaria* Wehrli, 1938**

China.

***Hydrelia subobliquaria* (Moore, 1868)***(Timandra)*

India, China, Nepal, Sikkim.

***Hydrelia subtestacea* Inoue, 1982**

Nepal, China.

***Hydrelia sylvata* ([Denis & Schiffermüller], 1775) (*Geometra*)***Hydrelia sachalinensis* Matsumura, 1925.*Phalaena testacea* Donovan, 1810.

Palearctic, from western Europe to Japan.

***Hydrelia tenera* (Staudinger, 1897) (*Cidaria*)**

Russia.

***Hydrelia terraenovae* Krogerus, 1954**

Canada.

***Hydrelia ulula* Bastelberger, 1911**

China (Taiwan).

***Hydrelia uudularia* (Leech, 1897) (*Venusia*)**

China, Nepal.

***Hydrelia undulosata* (Moore, 1888) (*Hyria*)**

India.

**Species excluded**Genitalia examined: *flavidula* (male, female).***'Hydrelia' flavidula* (Warren, 1907) (*Hastina*)**

Papua New Guinea.

REMARKS. This sexually dimorphic species does not belong to *Hydrelia* nor, indeed, to the *Asthenini*, although the uncus is absent. The frons is narrow and flat and the antenna in both sexes bears paired hair tufts, which are extremely long in the male. The labides are weak, united medially and bear a pair of setose processes. The valva is very long and narrow, with the

costa strongly sclerotized and with a sharp terminal process; the sacculus lacks a process. The female genitalia are similar to those of *Acolutha* Warren in having a globose corpus bursae covered with *Eupithecia*-like spines and an appendix bursae.

### ***Agnibesa* Moore, 1888**

(Figs 69–75; 190; 198, 231; 271.)

*Agnibesa* Moore, 1888: 256. Type species: *Somatina pictaria* Moore, 1868: 645.

**MOTH** (Figs 69–75). *Head*. Frons almost as prominent as in *Hydrelia*, but less broad. Labial palpi minute. Male antenna ciliated. *Wings*. White, variously marked, all species with some yellow suffusion particularly on forewing. Venation as in Fig. 190. Forewing relatively elongated, with apex not pointed, termen smooth; areole single and small; vein  $R_1$  diverges from stem of  $R_{2-5}$  after (i.e., distal to) point of divergence of vein  $R_5$ . Hindwing with termen crenulated; discocellulars not biangulate; vein  $M_2$  arising nearer  $M_1$  than  $M_3$ .

**MALE GENITALIA** (Figs 198, 231). Labides expanded at apex. Juxta narrow to moderate. Valva: sacculus extended into short, narrow projection beyond the valva. Aedeagus: vesica bearing numerous minute denticles. Sternum A8 unmodified.

**FEMALE GENITALIA** (Fig. 271). Ductus bursae with strongly sclerotized antrum of varying length. Corpus bursae globose with scattering of denticles or short spines arranged as an ill-defined band across middle; signum composed of radiating denticles, sometimes with second, smaller signum nearer posterior end of corpus.

**DIAGNOSIS.** The adults of most species of *Agnibesa* are larger than in *Hydrelia* and always have a pure white ground colour. Whereas in *Hydrelia* vein  $R_1$  of the forewing diverges from the common stem before  $R_5$  diverges, in *Agnibesa*  $R_1$  diverges after (distal to) the divergence point of  $R_5$ . The vesica of the aedeagus bears many minute denticles in *Agnibesa* but not in *Hydrelia*. The corpus bursae in *Agnibesa* has a conspicuous, largely medial scattering of denticles, which are lacking in *Hydrelia*. *Agnibesa* is distinguished from *Euchoeca* by the fact that the moths are larger, by the narrower forewing, the white ground colour and the presence of minute denticles on the vesica.

**DISTRIBUTION.** China, India, Nepal, Sikkim.

**SPECIES INCLUDED.** Six species. Genitalia examined: *pictaria pictaria* (male, female), *pictaria brevibasis* (male), *pleopictaria* (male, female), *plumbeolineata* (male, female), *punctilinearia* (male, female), *recurvilineata recurvilineata* (male, female), *recurvilineata meroplyta* (male, female), *venusta* (male).

### ***Agnibesa pictaria pictaria* (Moore, 1868)** (*Somatina*?)

India, Nepal, Sikkim, China (Tibet, from the frontier to Nepal to Medog).

### ***Agnibesa pictaria brevibasis* Prout, 1938**

China (Shanxi, Gansu, Sichuan, Yunnan, Tibet (recorded at Bomi, which is N E of Medog)).

**REMARKS.** The two subspecies of *pictaria* are geographically separated in Tibet by Mt Namjagbarwa (Xue & Zhu, 1999).

### ***Agnibesa pleopictaria* Xue, 1999**

China.

### ***Agnibesa plumbeolineata* (Hampson, 1895)** (*Hydrelia*)

Sikkim, China.

### ***Agnibesa punctilinearia* (Leech, 1897)** (*Hydrelia*)

China.

### ***Agnibesa recurvilineata recurvilineata*** **Moore, 1888**

India, Nepal, Sikkim.

### ***Agnibesa recurvilineata meroplyta* Prout, 1938**

China.

### ***Agnibesa venusta* Warren, 1897**

Sikkim, Nepal, China.

### ***Euchoeca* Hübner, [1823] 1816**

(Figs 76; 199, 232; 272.)

*Euchoeca* Hübner, [1823] 1816: 298. Type species: *Geometra hepararia* Hübner, [1799] 1796: pl. 11, fig. 58, a junior synonym of *E. nebulata* (Scopoli, 1763: 215).

**MOTH** (Fig. 76). *Head*. Frons a little less protuberant than in *Hydrelia*. Labial palpi minute, hardly extending beyond frons. Antenna with short cilia. *Wings*. Grey-brown. Forewing almost triangular, costa almost straight, termen weakly convex; areole single, vein  $R_1$  stalked with  $R_{2-5}$ , diverging from stem after  $R_5$ , which diverges at apex of areole (as in *Agnibesa*). Hindwing: termen smooth, angled at position of vein  $M_3$ ; discocellulars not biangulate; vein  $M_2$  arising well anterior to middle of discocellulars.



MALE GENITALIA (Figs 199, 232). Saccus broad. Labides narrow, curved, extending beyond tegumen. Juxta in form of a broad plate extending into a slender digitate process. Valva narrow at base, broadening apically into a broader lobe; sacculus extending just beyond margin of valva. Aedeagus: vesica lacking cornuti. Sternum A8 unmodified.

FEMALE GENITALIA (Fig. 272). Ductus bursae weakly sclerotized. Corpus bursae with two signa and a scattering of minute denticles; signum prominent, long and narrow, composed of radiating denticles; small, approximately round denticulate signum situated posteriorly.

DIAGNOSIS. Unlike the condition in the forewing of *Hydrelia*, in *Euchoeca nebulata* vein  $R_1$  diverges distal to the divergence point of vein  $R_5$ . The apex of the forewing is more rounded than in most species of *Hydrelia*. The male genitalia exhibit some similarity to those of *Agnibesa* and *Asthenotricha*, but *E. nebulata* is distinctly smaller than in these other genera and differs also in being almost uniformly grey-brown. The scattered denticles on the corpus bursae of *Euchoeca* are minute and far less prominent than those found in *Agnibesa* or *Asthenotricha*.

REMARKS. Only one species is recorded under this genus. The species, *cichisa* Prout, 1939 (Prout, 1934–1939: 253, pl. 18: c, type specimens from West China: Mt Omei, Gipfel., in BMNH, examined) was placed under *Euchoeca* by Parsons *et al.* (in Scoble, 1999) under the mistaken assumption that Prout had described it under that genus. In fact, *cichisa* was originally described under *Eupithecia* where it properly belongs.

DISTRIBUTION. Europe, Transcaucasia, Russia, Japan.

SPECIES INCLUDED. The genus is monotypic. Genitalia examined: *nebulata* (male, female).

### *Euchoeca nebulata* (Scopoli, 1763) (*Phalaena*)

*Geometra hepararia* Hübner, [1799].

*Geometra heparata* [Denis & Schiffmüller], 1775

*Phalaena obliterata* Hufnagel, 1767

*Phalaena strigata* Thunberg, 1788

Widespread in Europe, and across Russia to Japan.

FOODPLANTS. Betulaceae: *Alnus glutinosa*; *Alnus incana*; *Alnus*.

### *Epicyme* Meyrick, 1885

(Figs 77; 200, 233; 273.)

*Epicyme* Meyrick, 1885: 589. Type species: *Ptychopoda rubropunctaria* Doubleday, 1843: 287. [Replacement name for *Hippolyte* Meyrick.]

*Hippolyte* Meyrick, 1883: 526. Type species: *Ptychopoda rubropunctaria* Doubleday, 1843. [Junior homonym of *Hippolyte* Leach, [1814] 1830 (Crustacea).]

MOTH (Fig. 77). Head. Frons narrow, not prominent. Labial palpi narrow and short. Antenna simple, ciliated in male. Wings. Brownish with numerous wavy transverse lines, female with large, darker brown, irregular spots on lower half of forewing at postmedial position. Wing shape and venation of forewing as in *Hydrelia*, but vein  $R_1$ ,  $R_{2+4}$  and  $R_5$  arising independently from near apex of areole, not sharing a common stem. Hindwing: apex pointed, termen weakly angled medially; vein  $M_3$  of the hindwing stalked with  $CuA_1$ .

MALE GENITALIA (Figs 200, 233). Labides present as membranous outpushings of diaphragmata (difficult to discern in slide preparations) with numerous setae. Juxta with narrow extension. Valva weakly but distinctively curved; hair-like scales arising from apex; costa weakly sclerotized, broadened slightly at middle; sacculus not extended or otherwise modified. Aedeagus: vesica lacking cornuti.

FEMALE GENITALIA (Fig. 273). Ductus bursae mostly membranous, anterior portion sclerotized. Corpus bursae with small bundle of spines near cervix bursae; signum elliptical, composed of long radiating spines.

DIAGNOSIS. Many external characters are similar to those in *Hydrelia*, but the frons is narrow and not prominent in *Epicyme rubropunctaria*. The genitalia, however, differ strongly: in *Epicyme* the valva bears a series of long, fixed hair-like setae with expanded apices around its distal margin, the sacculus of the valva is not sclerotized and lacks an extension, the ductus bursae is unsclerotized posteriorly, and the signum is composed of long radiating spines rather than denticles. The male genitalia of *E. rubropunctaria* are similar to those of the monotypic Peruvian genus *Leucoctenorrhoe*, but there are many differences between them: notably, in *Leucoctenorrhoe* the antenna are bipectinate (in both sexes); vein  $R_1$  of the forewing arises independently from near the apex of the areole; and vein  $M_3$  of the hindwing is stalked with  $CuA_1$ .

DISTRIBUTION. Australia, New Zealand.

REMARKS. Unlike most *Asthenini*, the frons of this species is not prominent, the sacculus of the valva is not extended, and the labides are inconspicuous, membranous outpushings. However, the reduced condition of the labial palpi and the uncus, and the signum with its radiating spines means that the genus is reasonably included in the tribe.

SPECIES INCLUDED. One species is known. Genitalia examined: *rubropunctaria* (male, female).

***Epicyme rubropunctaria* (Doubleday, 1843)**  
(*Ptychopoda*)

*Asthena mullata* Guenée, 1868.

*Asthena risata* Guenée, [1858].

*Asthena vexata* Walker, 1869.

Australia, New Zealand.

***Eschatarchia* Warren, 1894**

(Figs 78; 201, 234; 274.)

*Eschatarchia* Warren, 1894: 395. Type species:

*Eschatarchia lineata* Warren, 1894: 295.

**MOTH** (Fig. 78). *Head*. Frons not broadened, slightly protuberant. Labial palpi minute, projecting slightly beyond head. Antenna in both sexes ciliate. *Wings* broad, off-white with strong markings at termen; both wings with termen angled at  $M_3$  and crenulated from apex to angle, nearly straight below angle; vein  $R_1$  diverging from the common stem of  $R_{2+4}$  beyond (distal to) the divergence point of  $R_5$ ; venation almost identical to that of *Agnibesa*, but forewing with areole larger.

**MALE GENITALIA** (Figs 201, 234). Saccus large. Labides broad, as long as the length of tegumen, expanded terminally into relatively membranous head. Juxta slightly constricted medially. Valva broad; sacculus well sclerotized, extending beyond margin, asymmetrical between each valva in shape and size. Aedeagus: vesica with patch of cornuti and three sclerotized plates. Sternum A8 of abdomen unmodified.

**FEMALE GENITALIA** (Fig. 274). Apophyses anteriores short. Ductus bursae strongly sclerotized to the distal part of corpus bursae. Corpus bursae covered almost entirely with minute denticles; signum composed of radiating denticles.

**DIAGNOSIS.** The wing colour and pattern of *Eschatarchia lineata* resembles that of *Chalyboclydon marginata* (excluded from Asthenini, see p. 106). The asymmetrical valvae and the wing markings are good distinguishing features of *Eschatarchia*. It is further distinguished from *Hydrelia* by its forewing venation, vein  $R_1$  diverging from the common stem of  $R_{2+4}$  beyond (distal to) the divergence point of  $R_5$ .

**DISTRIBUTION.** Japan, China, Burma.

**SPECIES INCLUDED.** One described species. Genitalia examined: *lineata formosana* (male), *lineata lineata* (male, female), undescribed species from Burma and West China (male).

***Eschatarchia lineata* Warren, 1894**

*Hydrelia angularia* Leech, 1897

*Eschatarchia lineata formosana* Inoue, 1970. **Syn. n.**

Japan, China, Burma.

**REMARKS.** The subspecies *formosana* was described (Inoue, 1970) because of its more deeply incurved submarginal dark line on the forewing and the slightly more pronounced angle of the termen. These characters, however, can be found in certain specimens of the nominate subspecies from Japan, and some of them vary even more strongly. The male genitalia of the type specimens of *lineata* and *formosana* are indistinguishable.

Prout (1934–1939: 180) wrote of a darker ‘form’ of *lineata* from Burma. The median band on the underside of both wings, which is composed of four dark lines, is complete, not interrupted or reduced. The male genitalia also differ somewhat from *lineata*: the sacculus lobe of the left side is markedly narrower, and the main bundle of cornuti are very weak and small, with the individual spines much shorter. Prout predicted that the form would probably be discovered in West China. We have, indeed, located a male from Sichuan Province, West China, which is quite similar to the specimen from Burma. Given the differences, it seems likely that the form from Burma and West China represents an undescribed species.

***‘Chalyboclydon’ flexilinea* Warren, 1898**

(Figs 79; 202, 235; 275.)

The generic placement of *flexilinea* is unclear. It is not congeneric with the type species of *Chalyboclydon* Warren (*C. marginata* Warren), with which it was combined in the past. However, given the substantial amount of work that is evidently needed on the Larentiinae, we prefer at this stage neither to force a doubtful recombination with another asthenine genus, nor to describe a new genus for *flexilinea*. Details of *marginata* are provided under *Chalyboclydon* below. The wing markings of *flexilinea* and *marginata* are similar but distinct (compare Figs 79, 180); the venation and genitalia differ markedly.

**MOTH** (Fig. 79). *Head*. Frons slightly more prominent than in *marginata*, labial palpi shorter. Antenna simple in both sexes. *Wings*. Forewing: apex less produced, termen hardly marked. Hindwing with hind margin elongate and a little incurved, anal angle pointed; termen hardly angled. Venation: forewing with areole absent; stalk of  $R_{1+5}$  arising from upper angle of cell;  $R_1$  diverges from common stalk after (distal to) point of divergence of  $R_5$ ; hindwing with  $Sc+R_1$  combined with  $Rs$  to near end of cell,  $Rs$  stalked with  $M_1$ ; cell in both wings extremely short, maximum length less than 1/3 of wing length; discocellulars less oblique than in *marginata*;  $M_2$  arising slightly closer to  $M_1$  than to  $M_3$ ;  $M_3$  stalked with  $CuA_1$ ,  $CuA_2$  arising near lower angle of cell.

MALE GENITALIA (Figs 202, 235). Saccus broad, with a narrower, nearly quadrate extension. Labides well developed, with bases triangular, apex slightly broadened and setose. Juxta broad. Valva costa simple; sacculus much simpler than in *marginata*, with small spine-like process extending just beyond margin of valva. Aedeagus: vesica with some scattered denticles. Abdomen: sternum A8 unmodified.

FEMALE GENITALIA (Fig. 275). Ductus bursae long, anterior half sclerotized. Corpus bursae long, shorter than ductus bursae, with two small signa composed of radiating denticles, one near cervix bursae and another at middle, dense covering of denticles on side opposite signa. Sternum A7 not modified.

DIAGNOSIS. '*C.*' *flexilinea* differs from *C. marginata* in several ways. The forewing lacks an areole and in the hindwing  $M_3$  is stalked with  $CuA_1$ . The very short cell in both wings differs from almost all other genera other than *Cleptocosmia*. In *Cleptocosmia* the palpi are longer and the basal half of the forewing is clothed with erect furry hair in the male. The male and female genitalia are distinctive.

DISTRIBUTION. India, Sikkim, Burma.

Genitalia examined: *flexilinea* (male, female).

### '*Chalyboclydon*' *flexilinea* Warren, 1898: 22

India, Sikkim, Burma.

REMARKS. The species was described from a single female specimen, labelled as *flexilinea* by Warren and, incorrectly, as *Chalyboclydon marginata* Warren by Prout (for details see below under *Chalyboclydon*).

### *Palpoctenidia* Prout, 1930

(Figs 80, 81; 203, 236; 259; 276.)

*Palpoctenidia* Prout, 1930: 311. Type species: *Chrysocraspeda phoenicosoma* Swinhoe, 1895: 294.

MOTH (Figs 80, 81). *Head*. Frons broad, moderately protuberant in male, flat in female. Labial palpi slender, extending slightly beyond frons. Antenna bipectinate in male, simple in female. *Wings* broad; forewing grey-brown with broad postmedian band nearly reaching termen; apex slightly produced, termen gently rounded, not angled at middle; areole absent in most specimens; vein  $R_1$  diverging from stem of  $R_{1-5}$  before (proximal to) point of divergence of  $R_5$ ;  $M_1$  arising from cell, which is nearly as long as half length of forewing. Hindwing with termen angled at middle; vein  $Sc+R_1$  combined with  $R_s$  to  $3/4$  of cell; veins  $R_s$  and  $M_1$  sharing short stalk; discocellulars not biangulate; vein  $M_2$  arising well anterior to middle of discocellulars.

MALE GENITALIA (Figs 203, 236, 259). Saccus broad, weakly excavated. Labides short, curved, well-

sclerotized with apices swollen and united medially, each element with small teeth projecting ventrally. Juxta: narrowing towards apex. Valva: densely setose at apex; sacculus distinctive, excavated terminally so appearing double pointed, with several strong spines subapically; base with long hairs arising from membranous pouch on each side. Aedeagus weakly curved; vesica lacking cornuti. Sternum A8 (Fig. 259) bearing row of setae along distal margin, otherwise unmodified.

FEMALE GENITALIA (Fig. 276). Bursa copulatrix: ductus bursae short, sclerotized throughout; corpus bursae globose, signum long, narrow and composed of stout radiating spines, arranged more sparsely than in usual condition, and diminishing in size to apex; surface of corpus with scattered minute denticles. Segment A7 with pair of lateral pockets.

DIAGNOSIS. The strong subapical spines on the sacculus and the row of setae along the distal margin of the abdominal sternum A8 in the male distinguish the single species of *Palpoctenidia* from all other genera in the Asthenini. *Palpoctenidia* resembles '*Chalyboclydon*' *flexilinea* in lacking an areole on the forewing and by the similar wing markings, notably the strongly protuberant postmedian band on the forewing. This band almost touches the termen medially whereas in *flexilinea* the band actually meets the termen. *Palpoctenidia* is also clearly distinguished from *flexilinea* by the bipectinate condition of the male antenna and the marked differences in the genitalia.

REMARKS. The excavated sacculus is similar to that found in *Asthena*. Although an areole is absent in most material of *P. phoenicosoma*, in four specimens in the BMNH from 'Rantaizan, Formosa' [Taiwan], collected by Wileman a single small areole is present.

Asthenine features of *Palpoctenidia* include the absence of an uncus and the presence of typically asthenine labides. The extension of the sacculus is notable and much modified. Although the signum is composed of stout spines, their radiating arrangement is merely a modification of the basic asthenine plan.

DISTRIBUTION. China, Japan, India.

SPECIES INCLUDED. One species. Genitalia examined: *phoenicosoma phoenicosoma* (male, female), *p. semilauta* (male).

### *Palpoctenidia phoenicosoma phoenicosoma* (Swinhoe, 1895) (*Chrysocraspeda*)

India, China.

### *Palpoctenidia phoenicosoma semilauta* Prout, 1938

Japan.



# *Asthenotricha* Warren, 1899

(Figs 82–111; 204, 205; 237, 238; 277, 278.)

*Asthenotricha* Warren, 1899: 34. Type species:  
*Asthenotricha dentatissima* Warren, 1899: 34.

*Asthenotricha* Debauche, 1938: 40. (An incorrect subsequent spelling.)

**MOTH** (Figs 82–111). *Head*. Frons less prominent than in *Hydrelia*. Labial palpi stronger and longer than in typical *Hydrelia*. Antenna: ciliated in male. *Wings*. Ochreous to purplish brown, often with broad fascia across forewings and hindwings forming a U in resting posture. Forewing: fairly broad; termen rounded, apex often pointed; tornus rounded; areole single; vein  $R_1$  diverges from  $R_{2+4}$  proximal to point at which  $R_5$  diverges; male of *dentatissima* group with patch of modified scales on dorsal and ventral surfaces. Hindwing: relatively broad, termen rounded; male of *dentatissima* group with costa markedly expanded and with large hairpencil on dorsal surface; hindwing unmodified in *argyridia* group; discocellulars not biangulate; anastomosis of  $Sc+R_1$  with  $Rs$  rather shorter than in most Larentiinae; vein  $Rs$  not stalked with  $M_1$  in type species, but stalked in most species.

**MALE GENITALIA** (Figs 204, 205, 237, 238). Tegumen/?uncus with distinctive, long, narrow anterior extension. Saccus broad, short. Labides in form of a pair of finger-like processes, usually extending to just beyond middle of tegumen. Juxta W-shaped, often with central arm long. Valva: costa straight; sacculus with well-developed finger-like extension. Aedeagus: vesica simple, without cornuti.

**FEMALE GENITALIA** (Fig. 277, 278). Ductus bursae: antrum with very wide mouth, narrowing so that antrum appears conspicuously Y- or V-shaped; colliculum usually very short and situated distinctively in middle of the membranous duct. Corpus bursae: signum long, narrow or pear-shaped, composed of radiating spines; prominent (*Eupithecia*-like) denticles present or absent from corpus bursae.

**DIAGNOSIS**. In *Asthenotricha* the most notable distinguishing features are the extended uncus/tegumen, the W-shaped juxta, the Y- or V-shaped antrum and the very short colliculum situated, usually, in the middle of the ductus bursae. The hindwing is broader than in *Hydrelia*, even in those species where it is not markedly expanded in the male.

**REMARKS**. We have included *Asthenotricha* in the Asthenini despite the presence of well developed labial palpi. What appears to be an uncus is also stronger than is typical for the tribe, and there are *Eupithecia*-like denticles on the corpus bursae of some species. However, the sacculus is extended, the form of the labides fits the condition widely encountered in the tribe, and

the signum is typically asthenine, being composed of radiating spines.

**DISTRIBUTION**. Afrotropics, including Madagascar.

**SPECIES INCLUDED**. Thirty-four.

## The *dentatissima* group

This group is distinguished by the presence of a hair tuft on the hindwing of the male and a broadened costa.

**SPECIES INCLUDED**. Twenty-six. Genitalia examined: *amblycoma* (male), *anisobapta* (male, female), *barnsae* (male, female), *dentatissima* (male, female), *flavicoma* (male), *lophopterata* (male, female), *malostigma* (male, female), *polydora* (male, female), *proschora* (male, female), *pynoconia* (male), *serraticornis* (male, female), *torata* (male, female), *tripogonias* (male, female).

## *Asthenotricha amblycoma* Prout, 1935

Equatorial Guinea.

## *Asthenotricha anisobapta* Prout, 1932

Kenya, Uganda.

## *Asthenotricha ansorgei* Warren, 1899

Kenya, Uganda.

## *Asthenotricha barnsae* Prout, 1935

Kenya, Uganda.

## *Asthenotricha comosissima* Herbulot, 1970

Madagascar.

## *Asthenotricha deficiens* Herbulot, 1954

Madagascar.

## *Asthenotricha dentatissima* Warren, 1899

Tanzania, Kenya, Uganda, Zaïre.

## *Asthenotricha fernandi* Prout, 1935

Equatorial Guinea.

## *Asthenotricha flavicoma* Warren, 1899

Cameroon, Uganda, Zaïre.

## *Asthenotricha furtiva* Herbulot, 1960

Madagascar.

## *Asthenotricha grandis* Herbulot, 1997

Rwanda.

*Asthenotricha lophopterata* (Guenée, [1858])  
(*Acidalia*)

Madagascar, Reunion.

*Asthenotricha malostigma* Prout, 1921

Zaire.

*Asthenotricha nesiotus* Herbulot, 1954

Madagascar.

*Asthenotricha parabolica* Herbulot, 1954

Madagascar.

*Asthenotricha polydora* Debauche, 1938 (as  
*Astenotricha*)

Uganda, Zaire.

*Asthenotricha proschora* Fletcher, 1958

Uganda, Zaire.

*Asthenotricha psephotaenia* Prout, 1935

Uganda, Zaire.

*Asthenotricha pycnoconia* Janse, 1933

South Africa, Uganda.

*Asthenotricha pythia* Debauche, 1938 (as  
*Astenotricha*)

Zaire.

*Asthenotricha quadrata* Herbulot, 1960

Madagascar.

REMARKS. In this species the hind margin of the forewing is not elongate. Both wings are shaped in a similar way to those in *Hydrelia*.

*Asthenotricha semidivisa semidivisa* Warren, 1901

Cameroon, Uganda.

*Asthenotricha semidivisa enchroma* Prout, 1921

Zaire.

*Asthenotricha serraticornis* Warren, 1902

Kenya, Tanzania, Uganda.

*Asthenotricha straba* Prout, 1921

Angola, Cameroon, Kenya, Uganda, Zaire.

*Asthenotricha torata* Prout, 1932

Madagascar.

REMARKS. This species differs from other species of the genus, as does *tripogonias*, by the forewing of the male, which is folded and bears conspicuous androconia. Prout (1932: 108) expressed his doubts that the species belonged to *Asthenotricha*. However, in both species the male genitalia fit the general pattern exhibited by the type species. Although the corpus bursae bears *Eupithecia*-like denticles, the antrum and colliculum are characteristic of *Asthenotricha*. Females differ from males in colour and markings. Contrary to Prout's description, a hair-tuft is in fact present on the hindwing of males of *torata*, although it is smaller and paler than in other species.

*Asthenotricha tripogonias* Prout, 1926

Réunion.

**The argyridia group**

In *argyridia* and its relatives, the hair tuft on the hindwing of the male is lacking and the costa of the hindwing is not broadened.

SPECIES INCLUDED. Eight species. Genitalia examined: *argyridia* (male, female), *costalis* (male), *inutilis* (male), *meruana* (male), *sjostedti sjostedti* (male), *strangulata* (male), *unipecten* (male, female).

*Asthenotricha argyridia* (Butler, 1894)  
comb. n. (*Cataclysmes*)

*Eulype? disparata* Warren, 1897

Kenya, Rwanda, Uganda.

*Asthenotricha candace* (Prout, 1929)  
comb. n. (*Hydrelia*)

Ethiopia.

*Asthenotricha costalis* (Aurivillius, 1910)  
comb. n. (*Hydrelia*)

Kenya.

*Asthenotricha inutilis* Warren, 1901

Cameroon, Kenya, South Africa, Uganda.

*Asthenotricha meruana* (Aurivillius, 1910)  
comb. n. (*Hydrelia*)

Tanzania.

*Asthenotricha sjostedti sjostedti* (Aurivillius, 1910) comb. n.

*Hydrelia sjostedti* Aurivillius, 1910.

Kenya, Tanzania.

***Asthenotricha sjostedti mionoseista* (Prout, 1921) comb. n. (*Hydrelia*)**

Rwanda, Zaïre.

***Asthenotricha strangulata* Herbulot, 1953**

Kenya.

***Asthenotricha unipecten* (Prout, 1915) (*Hydrelia*)**

*Hydrelia unipecten tansu* Prout, 1935.

Kenya, Uganda, Zaïre, São Tome & Principe.

REMARKS. Prout (1915; 1934–1939) noted that the antenna of the male is unipectinate. In fact this condition also occurs in the female, although the pectinations are shorter in this sex. Unipectinate antennae are rare in Larentiinae so this is an unusual character.

Further study is required to assess the taxonomic status of Prout's subspecies *tansu*.

***Venusia* Curtis, 1839**

(Figs 112–140; 191; 206–208; 239–241; 279–280.)

*Venusia* Curtis, 1839: 759. Type species: *Venusia caubrica* Curtis, 1839: 759.

*Discoloxia* Warren, 1895: 105. Type species: *Cidaria obliquisigna* Moore, 1888: 278.

MOTH (Figs 112–140). *Head*. Frons broad, generally protuberant. Labial palpi minute. Antenna of male ciliate or bipectinate with pectinations short. *Wings*. Whitish to grey; forewing usually darker than hindwing; rarely uniformly brown; broad, termen of both wings gently curved, not angled or dentate. Venation as in Fig. 191). Forewing with a single areole,  $R_1$  and  $R_{2-5}$  arising from apex of areole, or  $R_1$  diverging after short union with  $R_{2-5}$ ; vein  $M_1$  diverging from areole; discocellulars curved and oblique, occasionally biangulate. Hindwing with discocellulars biangulate, vein  $M_2$  arising from the second angle, close to  $M_3$ .

MALE GENITALIA (Fig. 206–208; 239–241). Saccus generally broader and longer than tegumen. Labides extending from bases of valvae with slightly expanded, setose apices, bases united with those of transtillae. Juxta weakly sclerotized, plate-like, sometimes pointed posteriorly. Valva: usually narrowing to apex rather than rounded; sacculus with prominent extension other than in *dilecta* Yazaki where process is absent. Aedeagus simple, vesica lacking cornuti. Sternum A8 of male not modified.

FEMALE GENITALIA (Figs 279, 280). Ductus bursae weakly sclerotized throughout length other than for a short membrane. Corpus bursae generally globose, often with numerous minute denticles, sometimes dense, or small spines; signum usually long and narrow,

sometimes pear-shaped, sometimes small and almost round, composed of radiating denticles, occasionally with additional small signum distally.

DIAGNOSIS. Similar to *Hydrelia*, but the hindwing discocellulars of *Venusia* are distinctly biangulate and sometimes the male antennae are bipectinate. In the female of *Venusia*, the surface of the corpus bursae lacks denticles more often than in *Hydrelia*. In those species of *Venusia* where denticles are present, they tend to be arranged more densely.

DISTRIBUTION. Palaearctic, Nearctic and Oriental regions.

SPECIES INCLUDED. Forty-two described species, one doubtfully included. Genitalia examined: *albinea* (male, female), *apicistrigaria* (female), *balausta* (male, female), *biangulata* (male, female), *blomeri blomeri* (male, female), *caubrica* (male, female), *comptaria* (male, female), *conisaria conisaria* (male, female), *crassisigna* (male, female), *eucosua* (male), *kioudjrouaria* (female), *laria laria* (male, female), *lilacina lilacina* (male, female), *linuata* (male, female), *maniata* (male, female), *maruoraria* (male, female), *naparia* (male, female), *nigrifurca* (male, female), *obliquisigna* (male, female), *ochrota* (male), *pallidaria* (male, female), *paradoxa* (male), *pearsalli* (male, female), *planicaput* (male, female), *punctiuncula* (male, female), *purpuraria* (male, female), *roseicosta* (male), *scitularia* (male, female), *scitularia* (male, female), *sikkimeensis* (male, female), *tchraria* (male, female), *violetaria* (male, female), *yasudai* (male, female).

***Venusia accentnata* (Prout, 1914) (*Discoloxia*)**

China.

***Venusia albinea* (Prout, 1938) (*Discoloxia*)**

Pakistan.

REMARKS. The female genitalia of this species has a small, almost round signum composed of radiating denticles. Otherwise *albinea* is a typical species of *Venusia*.

***Venusia apicistrigaria* (Djakonov, 1936) (*Discoloxia*)**

China.

***Venusia balausta* Xue, 1999**

China.

***Venusia biangulata* (Sterneck, 1938) (*Discoloxia*)**

China.



***Venusia blomeri blomeri* (Curtis, 1832)  
(*Melanippe*)**

*Cidaria pulchra* Eversmann, 1842.

Widespread in Europe, across Estonia, Latvia, Lithuania, Russia to Japan, China (far N E), and North America.

FOODPLANTS. Ulmaceae: *Ulmus glabra*; *Ulmus*.

***Venusia blomeri euchloe* (Bryk, 1949)  
(*Discoloxia*)**

Korea.

***Venusia blomeri szechuanensis* Wehrli, 1931**

China (S W).

***Venusia brevipectinata* Prout, 1938**

India.

***Venusia cambrica cambrica* Curtis, 1839**

*Venusia cambrica shuotsu* Bryk, 1949.

*Venusia cambricaria* Guenée, [1858] [Emendation of *cambrica* Curtis.]

*Hydrelia cambricata* Herrich-Schäffer, 1861. [Emendation of *cambrica* Curtis.]

*Eubolia erutaria* Boisduval, 1840

*Acidalia nebulosaria* Freyer, 1850

*Tephrosia scitularia* Walker, 1860

Widespread across the Holarctic region.

FOODPLANTS. Betulaceae: *Alnus incana tenuifolia*; *Alnus rubra*; *Betula*; Ericaceae: *Vaccinium*; Rosaceae: *Amelanchier*; *Malus*; *Sorbus americana*; *Sorbus aucuparia*; *Sorbus*; Salicaceae: *Populus trichocarpa*; *Salix*.

***Venusia cambrica aphrodite* Bryk, 1942**

Russia (Kurile Islands).

***Venusia comptaria* (Walker, 1860) (*Tephrosia*)**

*Venusia palumbes* Franclemont, 1938.

*Larentia perlineata* Packard, 1873.

*Euchoeca salienta* Pearsall, 1905.

Canada, U.S.A.

***Venusia conisaria conisaria* Hampson, 1903**

China, Nepal, Sikkim.

***Venusia conisaria hypoconia* (Prout, 1938)  
(*Discoloxia*)**

Kashmir.

***Venusia crassisigna* Inoue, 1987**

Nepal, China.

***Venusia dilecta* Yazaki, 1995**

Nepal.

***Venusia eucosma* (Prout, 1914) (*Discoloxia*)**  
China.

***Venusia inefficax* (Prout, 1938) (*Discoloxia*)**  
China.

***Venusia kasyata* Wiltshire, 1966**

Afghanistan.

***Venusia kioudjrouaria* Oberthür, 1893**

China.

***Venusia laria laria* Oberthür, 1893**

*Venusia laria* Oberthür, 1893.

China.

***Venusia laria ilara* (Prout, 1938) (*Discoloxia*)**  
Japan.

***Venusia lilacina lilacina* (Warren, 1893)  
(*Hydrelia*)**

Sikkim, Nepal.

***Venusia lilacina melanogramma* Wehrli, 1931  
subsp. rev. (*Venusia* (*Discoloxia*))**

China.

***Venusia lilacina rala* (Prout, 1938)  
(*Discoloxia*)**

Kashmir.

***Venusia limata* Inoue, 1982**

Nepal.

***Venusia lineata* Wileman, 1916**

China.

***Venusia maniata* Xue, 1999**

China.

***Venusia marmoraria* (Leech, 1897) (*Hydrelia*)**  
China.

***Venusia megaspilata* (Warren, 1895)**  
(*Discoloxia*)

Japan.

***Venusia naparia* Oberthür, 1893**

China.

***Venusia nigrifurca* (Prout, 1926) (*Discoloxia*)**

Burma, China.

***Venusia obliquisigna* (Moore, 1888) (*Cidaria*)**

India, Nepal, China.

***Venusia ochrota* Hampson, 1903**

*Venusia roseicosta* Yazaki, 1994, **syn. n.**

China, Nepal.

***Venusia pallidaria* Hampson, 1903**

Pakistan.

***Venusia paradoxa* Xue, 1999**

China.

***Venusia participata* (Sauter, 1869)**  
(*Eupithecia*)

Germany.

***Venusia pearsalli* (Dyar, 1906) (*Euchoeca*)**

Canada, U.S.A.

FOODPLANTS. Aceraceae: *Acer circinatum*;  
Betulaceae: *Alnus incana tenuifolia*; *Alnus rubra*; *Alnus viridis sinuata*; *Betula*; Cornaceae: *Cornus nuttalli*;  
Fagaceae: *Quercus garryana*; Rosaceae: *Crataegus*;  
*Malus*; Salicaceae: *Populus tremuloides*; *Populus trichocarpa*; *Salix*.

***Venusia phasma* (Butler, 1879) (*Emmelesia*)**

Japan.

***Venusia planicaput* Inoue, 1987**

Nepal, China.

***Venusia punctiuncula* Prout, 1938**

China.

***Venusia purpuraria* (Hampson, 1895)**

India.

***Venusia scitula* Xue, 1999**

China.

***Venusia semistrigata semistrigata* (Christoph, 1881) (*Cidaria*)**

Russia.

***Venusia semistrigata expressa* Inoue, 1963**

Japan.

***Venusia sikkimensis* (Warren, 1893)**  
(*Hydrelia*)

Sikkim, Bhutan, Nepal, India, China.

***Venusia syngenes* Wehrli, 1931 (*Venusia*)**  
(*Discoloxia*)

China.

***Venusia tchrraria* Oberthür, 1893**

China.

***Venusia violettaria* Wehrli, 1931 (*Venusia*)**  
(*Discoloxia*)

*Venusia* (*Discoloxia*) *violettaria kukunoora* Wehrli, 1931.

China.

***Venusia yasudai* Inoue, 1987**

Nepal.

## Species of uncertain identity

**'*Venusia*' *distrigaria* (Boisduval, 1833)**

Madagascar.

REMARKS. Boisduval (1833: 263) wrote of this species, under the name *Geometra distrigaria* Boisduval 'Elle a le port de la *Bilinearia* [sic] d'Europe, mais elle est un tiers plus petite.' However, there were no Geometridae species from Europe (or from anywhere else) named '*bilinearia*' before 1833. In his checklist to the Lepidoptera of Madagascar, Viette (1990: 248) cited *distrigaria* as unidentified and without the type having been found. Although the species was placed in *Venusia* by Parsons *et al.* (in Scoble, 1999), and in the card index to Geometridae in the BMNH, its identity and generic placement remain unclear.

***Nomenia* Pearsall, 1905 gen. rev.**

(Figs 141; 209, 242; 281.)

*Nomenia* Pearsall, 1905: 126. Type species: *Larentia duodecimlineata* Packard, 1873: 19.

*Nomenia* Pearsall; Ferguson in Hodges *et al.*, 1983: 104. (Listed as a junior synonym of *Venusia* Curtis.)

MOTH (Fig. 141). *Head*. Frons weakly protuberant. Labial palpi short and slender. Antenna: male with a short, single, fasciculate protrusion on each flagellomere; female simple. *Wings*. Usually with bands of multiple transverse lines, sometimes lines not conspicuous; termen smooth. Forewing medium grey; vein  $R_1$  stalked with  $R_{2-4}$ ,  $R_5$  arising independently from apex of areole, or, rarely, stalked with stem of  $R_{2-4}$ ; areole single; discocellulars strongly biangulate. Hindwing: pale grey to almost white, distinctly paler than forewing; discocellulars biangulate.

MALE GENITALIA (Figs 209, 242). Saccus smaller than tegumen. Labides extending to apex of tegumen, densely setose laterally. Juxta flask-shaped. Valva: costa densely setose, margin weakly convex; sacculus with long, finger-like extension, and a small, spined hump at base of extension. Aedeagus simple, without cornuti. Sternum A8 unmodified.

FEMALE GENITALIA (Fig. 281). Bursa copulatrix: ductus bursae sclerotized throughout; corpus bursae lacking signum, covered with *Eupithecia*-like spines except posteriorly, spines smaller towards anterior end of corpus bursae.

DIAGNOSIS. The genitalia of *Nomenia* exhibit a general similarity to *Venusia*, but the genus differs in the presence of a single protrusion on each flagellomere in the male and the presence of setae on the labides. The presence of numerous *Eupithecia*-type spines on the corpus bursae of the female of *Nomenia* and the absence in that sex of a discrete signum clearly distinguishes it from *Venusia*.

REMARKS. The similarities between the male genitalia of *Nomenia* and *Venusia* are notable. However, we prefer to revive *Nomenia* as a separate genus particularly because of the absence of a signum and the presence of typical *Eupithecia*-style denticles on the corpus bursae. Despite the absence of a typical asthenine signum, we retain the genus within the tribe given the close similarity between the genitalia and those of *Venusia*, and because of the reduced labial palpi. The absence of the asthenine signum is, therefore, interpreted as a loss.

DISTRIBUTION. North America.

SPECIES INCLUDED. Two species. Genitalia examined: *duodecimlineata duodecimlineata* (male, female).

***Nomenia duodecimlineata duodecimlineata* (Packard, 1873) (*Larentia*)**

*Nomenia unipecta* Pearsall, 1906

U.S.A. Type locality: California.

***Nomenia duodecimlineata secunda* Pearsall, 1906**

U.S.A.: Type locality: Colorado.

REMARKS. Listed as a subspecies by Ferguson in Hodges *et al.*, 1983: 104.

***Nomenia obsoleta* Swett, 1916**

Canada.

***Hastina* Moore, 1888**

(Figs 142, 143; 192; 210, 243; 282.)

*Hastina* Moore, 1888: 260. Type species: *Hastina caeruleolineata* Moore, 1888: 260.

MOTH (Fig. 142, 143). *Head*. Frons rounded, prominent. Labial palpi reduced, not significantly extended beyond frons. Antenna simple in both sexes, ciliated. *Wings*. Dark brown with weak yellowish lines (*caeruleolineata*) or pale brown with conspicuous and wider yellow lines (*pluristrigata*). Venation as in Fig. 192. Forewing: broad, apex pointed, termen concave below apex, produced at the end of  $M_3$  and  $CuA_1$ , straight below  $CuA_1$ ; areole single, small, vein  $R_1$  long, stalked with  $R_{2-4}$ ; vein  $R_5$  not stalked or only very briefly stalked with  $R_{1-4}$ ,  $R_1$  diverging from the stem well distal to base of  $R_5$ . Hindwing: strongly crenulated, with sharp 'teeth' at the end of  $M_1$  and  $M_3$  and excised between them; cell short, discocellulars angled at middle, but not biangulate, vein  $M_2$  arising at about upper 1/4 of discocellulars,  $M_3$  not stalked with  $CuA_1$ .

MALE GENITALIA (Fig. 210, 243). Uncus possibly present as a small, triangular vestige at apex of tegumen. Saccus broad, but smaller than in *Hydrelia*. Labides about half length of tegumen, broadening and rounded at apices. Juxta narrow. Valva: narrow, sacculus with a weakly sclerotized, slender spine-like extension. Aedeagus: simple, vesica without cornuti. Sternum A8 unmodified.

FEMALE GENITALIA (Fig. 282). Ductus bursae long, weakly sclerotized throughout except for a short membranous break at middle; antrum absent. Bursa copulatrix: corpus bursae globose with dense covering of *Eupithecia*-like denticles (*caeruleolineata*) or minute denticles (*pluristrigata*) on anterior half; signum composed of fairly long radiating spines.

DIAGNOSIS. The male genitalia broadly resemble those of *Hydrelia*. *Hastina*, *Macrohastina* and *Bihastina* can be distinguished from other asthenine genera by the strongly dentate termen of both fore- and hindwings. *Hastina* differs from *Macrohastina* by the different wing colour and pattern and the absence of cornuti on the vesica, and from *Bihastina* by differences in the venation and genitalia (see diagnosis under that genus).

REMARKS. The posterior extension of the juxta takes the form of a narrow tongue in *caeruleineata*, and it arises clearly from the juxta plate. In *pluristrigata*,



however, the structure is more strongly sclerotized and appears to be derived from a union of sclerites at the base of the valvae. A tongue-like sclerite does occur, confusingly, in *pluristrigata*, but it is not apparently an extension of the juxta as it is a sclerotization of the dorsal diaphragmata (fultura superior).

**DISTRIBUTION.** Burma, China, India, Japan, Russia.

**SPECIES INCLUDED.** Three species. Sometimes *caeruleolineata* is treated as subspecies of *subfalcaria*. Genitalia examined: *caeruleolineata* (male, female), *pluristrigata* (male, female).

***Hastina caeruleolineata* Moore, 1888**

Burma, China, India.

***Hastina pluristrigata* (Moore, 1868) (*Hyria*?)**

China, India.

**REMARKS.** Although the shape of the hindwing of this species is almost the same as in *caeruleolineata*, the genitalia of both sexes are distinctive, the anal papillae being strongly sclerotized and forming a short, pointed ovipositor. It is further distinguished from *caeruleolineata* by the more weakly crenulated condition of the forewing termen.

***Hastina subfalcaria* (Christoph, 1881)  
(*Acidalia*)**

Japan, Russia.

***Macrohastina* Inoue, 1982**

(Figs 144–146; 211, 244; 283.)

***Macrohastina*** Inoue, 1982: 471. Type species: *Erosia azela* Butler, 1878: 403.

**MOTH** (Fig. 144–146). Similar to *Hastina* in wing shape, but not colour and pattern. **Head.** Frons neither prominent nor broad. Labial palpi minute, not extending beyond frons. Antenna ciliated. **Wings.** Colour and pattern distinctive, very similar in all three species. Venation as for *Hastina* except: forewing: areole single; hindwing with vein  $M_2$  arising from middle of discocellulars, and vein  $M_3$  stalked or not stalked with  $CuA_1$ .

**MALE GENITALIA** (Figs 211, 244). Saccus similar to that in *Hastina* or slightly shorter. Labides slightly less prominent than in *Hastina*. Juxta narrow. Valva: sacculus produced into a short spine or merely a pointed lobe. Aedeagus: vesica with cornuti in form of spines or denticles.

**FEMALE GENITALIA** (Fig. 283). Ductus bursae broad posteriorly, narrowing toward middle of length; posterior half strongly sclerotized. Corpus bursae:

signum composed of radiating denticles; large patch of prominent *Eupithecia*-style denticles also present in *M. azela* and *M. gemmifera*, minute denticles present in *M. stenozona*.

**DIAGNOSIS.** The three species have a distinctive and very similar wing colour and pattern making the genus easy to distinguish from all others. The sclerotizations of the corpus bursae are also characteristic.

**REMARKS.** The three species in this genus are very similar in wing shape, colour and pattern and in genital structure. When describing the genus, Inoue (1982: 471) noted that in *M. azela* and *M. gemmifera* vein  $M_3$  of the hindwing is stalked with  $CuA_1$ . However, in *M. stenozona*  $M_3$  is not stalked so the venational character should not be considered diagnostic for the genus. Nevertheless, we retain the genus *Macrohastina* because of other similarities between the three species, although it might be argued that this genus, *Hastina* and *Bihastina* should be treated as synonymous.

**DISTRIBUTION.** China, Japan, India, Nepal, Burma.

**SPECIES INCLUDED.** Three species. Genitalia examined: *azela* (male, female), *gemmifera* (male, female), *stenozona* (male, female).

***Macrohastina azela* (Butler, 1878) (*Erosia*)**

Japan.

***Macrohastina gemmifera* (Moore, 1868)  
(*Acidalia*?)**

India, Nepal, China.

***Macrohastina stenozona* (Prout, 1926)  
comb. n. (*Hastina*)**

*Hastina azela stenozona* Prout, 1926.

*Hastina stenozona* Prout; Xue & Zhu, 1999.

Burma, India, China.

**REMARKS.** This species differs from the two others in the genus by the following characters: vein  $M_3$  is not stalked with  $CuA_1$  on the hindwing; the sacculus of the valva bears a well-developed extension; cornuti are arranged in two bundles of moderate length spines; the signum is much longer and narrower with denticles on the corpus bursae being very weak and small. However, the wing pattern and colour are extremely similar to the other two species, and *stenozona* would appear therefore to belong to *Macrohastina*.

***Bihastina* Prout, 1916**

(Figs 147–149; 212, 245; 284.)

***Bihastina*** Prout, 1916: 26. Type species: *Bihastina albulucens* Prout, 1916: 26.

MOTH (147–149). *Head*. Frons not protuberant. Labial palpi reduced, narrow, extending slightly beyond frons. Antenna not pectinate in male. *Wings*. Semi-translucent with extensive brown markings; termen of both wings deeply dentate. Forewing: two areoles present; vein  $R_1$  arising before apex of second areole, not sharing stalk with  $R_{2+4}$ ; vein  $R_5$  arising from apex of second areole together with  $R_{2+4}$ . Hindwing:  $Sc+R_1$  running close to costa for proximal half, almost touching costa after the cell; discocellulars slightly curved,  $M_2$  arising above middle of cell; vein  $M_3$  not stalked with  $CuA_1$ .

MALE GENITALIA (Figs 212, 245). Uncus probably present in form of a broad, squat, membranous structure. Saccus broad. Labides small, weakly sclerotized, with setose apices. Transtillae well-sclerotized, uniting medially. Juxta with broad base and narrower extension. Valva round terminally, without any extension or projection. Aedeagus: vesica lacking cornuti. Sternum A8 unmodified.

FEMALE GENITALIA (Fig. 284). Ductus bursae: antrum present in form of broad funnel; small colliculum present. Corpus bursae: signum appearing stellate, composed of long radiating spines.

DIAGNOSIS. The shape of the wings is similar to *Hastina* and *Macrohastina*. *Bihastina* differs from both these genera by the semi-translucent white wings marked with brown, the unstalked condition of vein  $R_1$ , the presence of two areoles on the forewing, and the rounded rather than elongated shape of the signum.

REMARKS. The structure at the apex of the tegumen is possibly the uncus, although it is membranous and not the typically narrow uncus occurring so widely in Geometridae. The labides are difficult to observe, but appear to be present, although small and inconspicuous, and situated just ventral to the well-sclerotized transtillae which are united to form a strong band dorsal to the aedeagus.

DISTRIBUTION. New Guinea.

SPECIES INCLUDED. Three species. Genitalia examined: *albolucens* (male, female), *subviridata* (male).

### *Bihastina albolucens* Prout, 1916

West Irian.

### *Bihastina subviridata* (Bethune-Baker, 1915) (*Hastina*)

*Bihastina mera* Prout, 1926.

Papua New Guinea.

### *Bihastina viridata* (Warren, 1906) (*Hastina*)

Papua New Guinea.

## *Leucoctenorrhoe* Warren, 1904

(Figs 150; 213, 246; 285)

*Leucoctenorrhoe* Warren, 1904: 526. Type species:

*Leucoctenorrhoe quadrilinea* Warren, 1904: 527.

MOTH (Fig. 150). *Head*. Frons protuberant as in *Hydrelia*. Labial palpi extremely narrow and short. Antenna in both sexes bipectinate, pectinations very long. *Wings*. White; lines less wavy than in usual *Asthenini* condition; forewing somewhat narrower and rounder than in most *Asthenini*. Forewing: areole single, vein  $R_1$  diverging from common stem distal to point at which  $R_5$  diverges; vein  $M_2$  arising slightly closer to  $M_1$  than to  $M_3$  in both fore- and hindwing. Hindwing slightly angled at middle of termen; discocellulars straight, not angled; vein  $M_1$  stalked with  $Rs$ ;  $M_3$  stalked with  $CuA_1$ , length of stalk variable.

MALE GENITALIA (Fig. 213, 246). Labides with broad apices. Juxta flask-shaped. Valva short, broad, rounded, lacking any extension; apex fringed with hair-like scales expanded at their tips, each scale about as long as valva. Aedeagus short and broad; vesica with small sclerotization, lacking spine-like cornuti. Sternum A8 unmodified.

FEMALE GENITALIA (Fig. 285). Anal papillae short and broad; apophyses strong. Ductus bursae short, with small colliculum. Corpus bursae globose; signum pear-shaped, composed of radiating denticles.

DIAGNOSIS. *Leucoctenorrhoe quadrilinea* is distinguished from *Asthenini* by the presence of bipectinate antennae in both sexes and by the different venation. *Leucoctenorrhoe* differs from those other genera in which vein  $R_1$  diverges distal to  $R_5$  on the forewing, and in which hindwing vein  $M_3$  is stalked, by the bipectinate antenna, the long cell on the hindwing and the pure white ground colour of both wings. The male genitalia differ from all other *Asthenini* notably in the short valva with the presence of long scale-like hairs fringing its apex and the short, broad aedeagus. Although the hairs around the apex of the valva occur also in *Epicyme*, the antennae, venation, aedeagus and female genitalia are different. See diagnosis of *Epicyme*.

REMARKS. The Peruvian *Leucoctenorrhoe quadrilinea* is the only species of *Asthenini* recorded from the Neotropics.

DISTRIBUTION. Peru.

SPECIES INCLUDED. Monotypic. Genitalia examined: *quadrilinea* (male, female)

## *Leucoctenorrhoe quadrilinea* Warren, 1904

Peru.

# ***Parasthena* Warren, 1902**

(Figs 151; 214, 247; 260, 261; 286.)

*Parasthena* Warren, 1902: 361. Type species: *Parasthena flexilinea* Warren, 1902: 362; Holloway, 1997: 183.

**MOTH** (Fig. 151). *Head*. Frons less broad and prominent than in *Hydrelia*. Antenna simple, nearly smooth in both sexes. Labial palpi minute. *Wings*. Pale grey-brown with darker multiple fasciae and black discal spots. Forewing shaped as in *Hydrelia*, termen weakly angled; male with small anal lobe; cell short and broad; areole single; vein  $R_5$  separate, arising from below angle of areole. Hindwing: male with posterior margin folded under wing; termen slightly produced at  $M_1$  and  $M_2$ ; cell short and broad,  $Sc+R_1$  united with  $R_s$  to  $3/4$  of cell,  $M_1$  stalked with  $R_s$ , discocellulars not biangulate.

**MALE GENITALIA** (Figs 214, 247; 260, 261; 286). Tegumen long and narrow. Saccus short and narrow. Labides short. Juxta flask-shaped. Valva broad, covered with long hairs; sacculus without a projection. Aedeagus: vesica lacking cornuti. Sternum A8 with anterior margin produced into pair of short but conspicuous apodemes; tergum A8 with anterior margin produced into a single conspicuous, medial projection.

**FEMALE GENITALIA** (Fig. 286). Ductus bursae: antrum leading into short membranous section of ductus; colliculum long and conspicuous. Corpus bursae: oval rather than globose, with scattering of very weak denticles in region of signum; signum prominent, elongated, composed of long radiating spines.

**DIAGNOSIS.** The genitalia exhibit many similarities to those of *Poecilasthena*: the tegumen is similarly extended and the saccus is short and of a similar shape; the juxta is of the same form; sternum A8 in the male is modified in both genera; and, in the female, the narrowness of the ductus bursae with its associated colliculum are similar. *Parasthena* is, however, distinguished from *Poecilasthena* by having a single areole, an unexpanded costa of the valva, and a prominent colliculum.

**REMARKS.** Holloway (1997: 183) removed *Parasthena* from synonymy with *Hydrelia*, noting that it lacked certain characters of the Asthenini. It is very close to *Poecilasthena*, but we have not synonymized the genera because of the presence of a single areole and a much larger colliculum in *Parasthena*.

We have also examined further specimens from Seram and Papua New Guinea of material representing what was noted by Holloway (1997: 184) as 'a related, somewhat more strongly marked, undescribed species'. In the forewing, the costa is heavily marked with dark grey, especially toward apex; the termen is more excavated between the apex and vein  $M_3$  than in *flexilinea*;

and the angle of the wing is more pronounced. In the hindwing, the termen is more strongly dentate than in *flexilinea*, notably at  $M_1$  and  $M_3$ . The median band on the forewing and the postmedian band on both wings are darker than in *flexilinea*. The genitalia, however, are not convincingly different, and we are undecided about the taxonomic status of this material.

**DISTRIBUTION.** Sulawesi; Philippines; Borneo; Seram; Papua New Guinea.

**SPECIES INCLUDED.** A single named species. Genitalia examined: *flexilinea* (male, female).

# ***Parasthena flexilinea* Warren, 1902**

Sulawesi, Philippines, Borneo.

# ***Poecilasthena* Warren, 1894**

(Figs 152–171; 215–218; 262–265; 287–290, 295)

*Poecilasthena* Warren, 1894: 394. Type species: *Acidalia pulcherraria* Doubleday, 1843: 286. *Astheniodes* Hampson, 1903: 647. Type species: *Astheniodes polycynaria* Hampson, 1903a: 648. *Poecilasthena* Warren; Holloway, 1997: 182.

**MOTH** (Figs 152–171). *Head*. Frons narrow, not prominent. Labial palpi minute, extended slightly beyond frons. Antenna simple, with short cilia. *Wings*. Ground colour of fore- and hindwings generally white, marked with numerous transverse lines, pale grey in *papuensis* group; lines usually pale green to greyish green; wings brown in some species. Forewing: triangular; cell with a minute spot; termen slightly curved, anal angle well expressed; cell longer than half-length of wing; areole double; vein  $R_1$  arising from before apex of areole;  $R_5$  arising from apex of areole together with  $R_{2+4}$ . Hindwing: termen slightly angled medially, sometimes rounded, anal margin slightly longer than costa, discocellulars strongly biangulate or not biangulate (*papuensis* group).

**MALE GENITALIA** (Figs 215–218, 262–265). Saccus ranging from broad to narrow. Labides curved, forming a harp-like structure, extending as posteriorly directed, broader membranous projections from base of costa. Juxta flask-shaped. Valva covered with setae; sacculus not extended; costa broadened at middle, setae absent from broadened part of costa; coremata prominent, arising from base of valva, or absent. Aedeagus short; vesica with cornuti arranged in a bundle of short spines, sometimes in two bundles, or cornuti absent. Sternum A8 often with proximal margin produced on each side so appearing W-shaped, sometimes the two extensions long and pointed.

**FEMALE GENITALIA** (Figs 287–290; 295). Ductus bursae short, with small colliculum at lower part. Corpus bursae usually globose or subglobose, rarely



more elongated; signum round or oval, composed of spines radiating from denticulate core, sometimes with marked medial ridge (as in Fig. 295).

**DIAGNOSIS.** In most species of *Poecilasthena* the discocellulars of the hindwing are strongly biangulate, unlike the situation in *Asthena*. The two species in the *papuensis* group, where the discocellulars are not biangulate, are distinguished from *Asthena* mainly by differences in the genitalia. In the male, the costa of the valva is broadened and hairless, in many species there are a pair of well developed coremata attached to the base of the valva, and sternum A8 often bears a pair of projections from the anterior margin. In the female, the ductus bursae is membranous other than for a small colliculum, and the signum is often circular, with the spines in the middle being minute and those extending from the margin being very long. *Poecilasthena* exhibits many similarities to *Parasthena* but has a double areole (single in *Parasthena*).

**REMARKS.** Some variation occurs within the genus. In *pulchraria* and *subpurpureata* (Walker) the saccus is smaller and the sacculus very short with a small needle-like terminal process arising from the base of the valva and separating from it slightly. Coremata are absent and the cornuti are arranged in two bundles. Sternum A8 is weakly modified with both ends of the proximal edge extended proximally.

In *papuensis* and *euthecta*, the discocellulars in the hindwing are not biangulate and tergum A8 of the male has a medial projection extending from the anterior margin. In the female, the antrum is larger and the signum is smaller with the spines at the middle larger and gradually becoming longer toward the edges.

Notable similarities exist between *Poecilasthena* and the Eupitheciini in the form of the labides in the male genitalia and the colliculum in the female genitalia. In *Eupithecia* the juxta is shaped characteristically like an hourglass. The 'lower' (anterior) part of each labides takes the form of a narrow, elbowed rod, one end of which extends into the waist of the hourglass. The 'upper' (posterior) part of the labides, which is less well sclerotized, is broader than the lower section. In *Poecilasthena* the juxta is flask-shaped with a broad anterior element from which extends a narrow, rod-like component. Although the shape of the juxta differs from that present in *Eupithecia*, the labides are notably similar. The anterior sclerite narrows and almost meets the rod-like component of the juxta. The posterior part is broader and more membranous. In the female, the ductus bursae is narrow in *Poecilasthena* and *Eupithecia* (and in *Parasthena*) and there is a small colliculum.

**DISTRIBUTION.** Australia, Burma, Fiji, Indonesia, Malaysia, New Caledonia, New Zealand, Papua New Guinea, Philippines.

**BIOLOGY.** Details of life histories were recorded by McFarland (1979: 41, 42) for two species (*P. pulchraria* and an undetermined species) and, for *P. pulchraria* by McFarland, 1988: 352–354), and were summarized by Holloway (1997: 182). The larva fed on leaves, flowers and fruits of *Astroloma humifusum* (Epacridaceae, the Australian Heaths), a plant considered likely to be the wild host. The second species (not '*?ischnophrica* Turner' as suggested by McFarland, 1979, see Holloway, 1997), was found feeding on *Leptospermum myrsinoides*.

**SPECIES INCLUDED.** 32 species. Genitalia examined: *aedoea* (male), *anthodes* (male), *burmensis* (male), *character* (male, female), *dimorpha* (male, female), *leucydra* (male, female), *nubivaga* (male, female), *papuensis* (male, female), *prouti* (female), *pulchraria* (male, female), *scoliota* (female), *schistaria* (male, female), *subpurpureata* (male, female), *xylocyma* (male, female).

### *Poecilasthena aedoea* Turner, 1926

Australia.

### *Poecilasthena balioloma* (Turner, 1907) (*Asthena*)

Australia.

### *Poecilasthena burmensis* Prout, 1926

Burma.

### *Poecilasthena character* Prout, 1932

Indonesia, Malaysia.

### *Poecilasthena cisseres* Turner, 1933

Australia.

### *Poecilasthena dimorpha* Holloway, 1979

New Caledonia.

**REMARKS.** This species exhibits features differing from typical *Poecilasthena*. In the forewing, vein  $R_5$  arises from below the apex of the areole, whereas in other species of this genus it typically arises at the apex. The posterior margin of the hindwing is longer than in other species belonging to the genus and the termen is rounded and not angled. In the male, the valva is distinctive being broad with a narrow base and a dense arrangement of long hairs fringing its distal margin. In the female, the corpus bursae is elongated rather than globose or subglobose and the signum is elongated, not rounded.

### *Poecilasthena euphylla* (Meyrick, 1891) (*Asthena*)

Australia.

***Poecilasthena fragilis* Turner, 1942**

Australia.

***Poecilasthena glaucosa* (Lucas, 1888) (as *Iodis*)**

*Euchloris* (*Iodis*) *microgyna* Lower, 1894

Australia.

***Poecilasthena inhaesa* Prout, 1934**

Fiji.

***Poecilasthena iopolia* (Turner, 1926) (*Eccymatoge*)**

Australia.

***Poecilasthena ischnophrica* Turner, 1941**

Australia.

***Poecilasthena leucydra* Prout, 1934**

Fiji, New Caledonia.

***Poecilasthena limnaea* Prout, 1926**

New Guinea.

***Poecilasthena nubivaga* Prout, 1932**

Indonesia (western).

***Poecilasthena oceanias* (Meyrick, 1891) (*Asthena*)**

Australia.

***Poecilasthena panapala* Turner, 1922**

Australia.

***Poecilasthena paucilinea* Warren, 1906**

Papua New Guinea.

***Poecilasthena phaeodryas* Turner, 1931**

Australia.

***Poecilasthena pisicolor* Turner, 1942**

Australia.

***Poecilasthena prouti* West, 1929 (as *Poecilasthenia*)**

Philippines.

***Poecilasthena pulchraria* (Doubleday, 1843) (*Acidalia*)**

*Asthena ondinata* Guenée, [1858]

*Chlorochroma plurilineata* Walker, 1861

*Asthena pulchraria decolor* Turner, 1904

New Zealand, Australia.

FOODPLANTS. Epacridaceae: *Astroloma*; *Brachyloma*; *Epacris*; *Monotoca*.

***Poecilasthena scoliota* (Meyrick, 1891) (*Asthena*)**

Australia.

***Poecilasthena sthenommata* Turner, 1922**

Australia.

***Poecilasthena subpurpureata* (Walker, [1863]) (*Asthena*)**

*Astheniodes polycymaria* Hampson, 1903

*Acidalia tuluata* Felder & Rogenhofer, 1875

New Zealand.

REMARKS. The holotype of *polycymaria* is labelled as being from India, which, if correct, would give a very peculiar distribution pattern for *subpurpureata*. Comparison of the genitalia of the male holotype of *polycymaria* with those of a specimen of *subpurpureata* from New Zealand shows a remarkable good match between the structures and there seems to be no reason to treat *polycymaria* as a separate species. Prout (1927: 76) regarded the type locality as being 'evidently in error', and it is difficult to dispute that comment.

***Poecilasthena thalassias* (Meyrick, 1891) (*Asthena*)**

*Asthena pellucida* Lucas, 1892

Australia, Papua New Guinea.

***Poecilasthena nrarcha* (Meyrick, 1891) (*Asthena*)**

Australia (including Tasmania).

REMARKS. The wings of this species are green and the termen of the hindwing shows no sign of an angle.

**The *papuensis* group**

Two species previously assigned to *Asthena* are here transferred to *Poecilasthena*. One of them was originally described under *Hydrelia*. Their association with *Asthena* is explained by the fact that, unlike the condition in other *Poecilasthena*, the discocellulars in the hindwing are not biangulate. However, the genitalia closely resemble those of other *Poecilasthena* and sternum A8 is modified similarly to *Poecilasthena*. See also 'Remarks' under the generic description above.

***Poecilasthena euthecta* (Turner, 1904)****comb. n. (*Asthena*)**

Australia.

REMARKS. Nielsen, Edwards & Rangsi (1996) treated this species in *Minoa*. However, the genitalia structures are not consistent with those of *Minoa*.

***Poecilasthena papuensis* (Warren, 1906)****comb. n. (*Hydrelia*)**

Papua New Guinea.

**The anthodes group**

The moths of this cohesive species group are brown. The labides are fairly long, nearly extending to the end of the tegumen, the saccus is narrow, coremata extend from the base of each valva and the vesica lacks cornuti. Sternum A8 is markedly elongate being twice the length of the other sterna; the proximal end is rounded, and from 1/3 toward the distal end it become very narrow, before broadening a little distally. Tergum A8 is not modified. The female genitalia are indistinguishable from those of other *Poecilasthena* species.

***Poecilasthena anthodes* (Meyrick, 1891)****comb. n. (*Asthena*)**

Australia.

***Poecilasthena schistaria* (Walker, 1861)****comb. n. (*Acidalia*)**

New Zealand.

***Poecilasthena xylocyma* (Meyrick, 1891)****comb. n. (*Asthena*)**

Australia.

***Polynesia* Swinhoe, 1892**

(Figs 172–174; 219, 252; 291.)

*Polynesia* Swinhoe, 1892: 4. Type species: *Pomasia sunandava* Walker, 1861: 657; Holloway, 1997: 189. *Platome* Warren, 1894: 395. Type species: *Polynesia truncapex* Swinhoe, 1892: 5.

MOTH (Figs 172–174). *Head*. Frons narrow, not protuberant. Labial palpi long and robust, not slender, extending about 1/4 to 1/3 beyond front of head. Antenna in both sexes simple, with very short cilia. *Legs*. Hind tibia of male with terminal spurs only; hind femur of male expanded and with thick hair pencil in groove. Hind tibia of female with all spurs present. *Wings*. Primrose yellow variously marked with irregular, rufous spots. Forewing with costa somewhat broadened near base, termen very weakly crenulated, slightly produced medially, concave under  $CuA_2$ ; areole

single, small, all radial veins stalked,  $R_1$  diverging from stalk distal to divergence point of  $R_5$ ; male forewing of *truncapex* truncated so costa appears angled; tip of angle folded over dorsal surface. Hindwing: apex rounded, termen produced both at  $M_1$  and  $CuA_1$ ; cell short, not longer than 1/3 length of hindwing; discocellulars gently curved;  $M_2$  arising a little above middle of discocellulars,  $Rs$  and  $M_1$ ,  $M_3$  and  $CuA_1$  stalked; sometimes underside of male hindwing with hair tuft at base of cell or hair ridge along wing. *Abdomen*. Long and narrow in both sexes; tympanal organ with length exceeding that of first visible sternum (A2); anterior angles of second visible sternum (A3) also produced.

MALE GENITALIA (Figs 219, 252). Saccus quadrate. Tegumen narrow and long, uncus vestigial. Labides prominent, forming long, well-sclerotized, curved spines. Juxta in form of fairly small, irregular plate. Valva fairly broad, simple, setose; sacculus not projecting beyond margin of valva, elbowed terminally, but without terminal projection. Aedeagus simple, cornuti lacking. Last tergum and sternum elongated, sternum usually longer than tergum.

FEMALE GENITALIA (Fig. 291). Ductus bursae membranous posteriorly, with long antrum anteriorly. Corpus bursae: globose; signum composed of radiating denticles; small additional signum present near cervix bursae in *sunandava*.

DIAGNOSIS. This genus is easily distinguished from other Asthenini by the primrose yellow wing colour dotted with irregular rufous spots and the venation. The smooth, large hook-like labides in the male genitalia are highly distinctive.

The wing colour of *Polynesia* is very similar to that of *Pseudopolynesia* Holloway. *Polynesia* is easily distinguished from *Pseudopolynesia* in the structure of the genitalia. The male of *Pseudopolynesia* lacks the conspicuous labides of *Polynesia* and the shape of the tegumen differs between them. In the female of *Pseudopolynesia* there is no signum and the bursa copulatrix is double.

DISTRIBUTION. India, China, Thailand, N.E. Himalaya, Malaysia, Indonesia, Sri Lanka, Papua New Guinea.

REMARKS. The labial palpi are longer than is usual in Asthenini and certain features of the male genitalia are peculiar. However, typical asthenine characters are the reduced uncus, the signum being composed of radiating denticles, and the presence of a small areole on the forewing.

SPECIES INCLUDED. Three species. Genitalia examined: *curtitibia* (male, female), *sunandava* (male, female), *truncapex* (male, female).



***Polynesia curtitibia* Prout, 1922**

India, Thailand, N.E. Himalaya, Malaysia.

***Polynesia sunandava* (Walker, 1861)  
(*Pomasia*)**

*Cambogia?* *aeriferata* Walker, [1863].

Sri Lanka, India, Malaysia, Indonesia, China, Papua New Guinea.

***Polynesia truncapex* Swinhoe, 1892**

India, China, Malaysia, Indonesia.

***Anydrelia* Prout, 1938**

(Figs 175–177; 220, 253; 292.)

*Anydrelia* Prout, 1938: 177 (see Prout, 1934–1939).  
Type species: *Brabira plicataria* Leech, 1897: 72.

**MOTH** (Figs 175–177). *Head*. Frons broad, prominent in male, flat in female. Labial palpi minute, not extended beyond frons. Antenna: weakly serrate in male with short cilia, simple in female. *Wings*. Brown, with darker but weak postmedial band and even weaker subterminal line; hindwing much smaller than forewing in both sexes. Forewing broad, costa much longer than dorsum, apex slightly produced, termen rounded; areole single; vein  $R_1$  and  $R_{2+5}$  diverging beyond (distal to) areole; vein  $R_5$  diverging almost at end of areole and proximal to divergence point of  $R_1$ ; vein  $M_1$  diverging from areole, discocellulars curved,  $M_2$  arising slightly closer to  $M_1$  than to  $M_2$ . Hindwing of both sexes markedly smaller than forewing, termen rounded, anal lobe in male expanded and folded under wing, ventral surface with numerous specialized scales, dorsal surface with long hair-scales;  $Sc+R_1$  combined with  $R_s$  to 3/4 of cell, which is as long as half length of the wing;  $R_s$  united for short distance with  $M_1$ ,  $M_1$  curved downwards, discocellulars strongly biangulate,  $M_2$  arising from the second angle, very near  $M_3$ .

**MALE GENITALIA** (Figs 220, 253). Saccus short. Labides reduced to pair of setose membranous heads. Juxta broad basally, narrowing slightly towards apex, which is divided. Valva broad, with the costa incurved, sacculus not sclerotized, but with a small sharp terminal process arising from just beyond the middle valva. Aedeagus: vesica lacking cornuti. Sternum A8 unmodified.

**FEMALE GENITALIA** (Fig. 292). Ductus bursae weakly sclerotized throughout. Corpus bursae covered with minute denticles; signum absent.

**DIAGNOSIS.** This genus is very easy to distinguish from other asthenine genera by the specialized hindwing in the male and by the absence of the asthenine signum in the female. Typical Asthenini characteris-

tics include a broad, protuberant frons, minute labial palpi, a reduced uncus, short labides and a sclerotized ductus bursae.

**DISTRIBUTION.** China, India, Nepal.

**REMARKS.** The absence of a typical asthenine signum is interpreted as a loss.

**SPECIES INCLUDED.** Three species have been described in this genus. Genitalia examined: *distorta* (male, female), *plicataria* (male, female).

***Anydrelia dharmsalae* (Butler, 1883) (*Ephyra*)**

India.

***Anydrelia distorta* (Hampson, 1895)  
(*Hydrelia*)**

India, Nepal, China.

***Anydrelia plicataria* (Leech, 1897) (*Brabira*)**

China.

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**GENERA EXAMINED AND  
EXCLUDED FROM THE ASTHENINI**

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The following genera exhibit some similarity to the Asthenini, but we have excluded them from the core group for reasons given under each genus. Three of the genera included below are treated in the same detail as those above: *Minoa* Treitschke, which is one of the three genera included by Pierce (1914) in his definition of the Asthenini; *Cleptocosmia* Warren, which was listed by its describer in the original use of the family group name Astheninae; and *Chalyboclydon* Warren, the composition of which is complex (see above).

***Minoa* Treitschke, 1825**

(Figs 178, 179; 221, 254; 267; 293.)

*Minoa* Treitschke, 1825: 445. Type species: *Geometra euphorbiata* [Denis & Schiffermüller], 1775: 116 (a junior subjective synonym of *Phalaena murinata* Scopoli, 1763: 229).

**MOTH** (Figs 178, 179). *Head*. Frons not prominent. Labial palpi more rough scaled than in most Asthenini and not strongly reduced. Antenna: male with short cilia. Wings: drab, dark to medium grey-brown or ochreous, margins smooth, not crenulated; costa of forewing short, termen relatively straight. Forewing: areole double; vein  $R_1$  arises from well before apex of second areole, veins  $R_2$ ,  $R_{3+4}$  and  $R_5$  arise, independently, from its apex. Hindwing: discocellulars oblique, not biangulate.

MALE GENITALIA (Figs 221, 254; 267). Saccus rounded. Labides digitate, curved. Juxta in form of a large plate produced posteriorly into a long, finger-like process. Valva distinctive, narrow; costa and sacculus strongly sclerotized each terminating as a spine. Aedeagus: broad; vesica with a single, long cornutus or a single short cornutus subtended by a sclerite. *Abdomen* (Fig. 267) terga and sterna well-sclerotized in both male and female; sternum A8 trapezoidal in male.

FEMALE GENITALIA (Fig. 293). Anal papillae short, membranous. Bursa copulatrix: ductus bursae prominent, broad, strongly and uniformly sclerotized, extending into small corpus bursae, which is suddenly demarcated from remaining membranous corpus; signum, when present, small, composed of a few spines, not of radiating denticles and spines.

DIAGNOSIS. This distinctive genus is recognizable particularly by the uniform wing colour of the moths, the shape of the valva, the form of the ductus bursae, and the strongly sclerotized condition of the sterna and terga of the abdomen in both sexes.

DISTRIBUTION. Europe, including Eastern Europe.

REMARKS. *Minoa* was included in 'Astheninae' by Pierce (1914: 38) in the paper that first defined the group, but there is no sound reason to associate it with the core of the tribe. Although the uncus is reduced and labides are present, the labial palpi are relatively robust, and while the sacculus is extended, the extension does not resemble that typical in Asthenini, indeed, the overall shape of the valva is unusual. The female genitalia are highly distinctive and lack the typical asthenine signum. The tribal association of *Minoa* remains unclear.

*Minoa* is considered currently to include just one polytypic species. However, a preliminary study of the genitalia of specimens from several localities suggests that there are, in fact, two species. For the purposes of the present paper we accept the identity of the type species as the widespread species, although this requires confirmation. Further study is being undertaken to establish the content of the genus and the names that should be associated with the species involved.

SPECIES INCLUDED. Probably two species, one of which is described. Genitalia examined: *murinata murinata* (male, female), *murinata amylaria* (male, female).

The variation within *Minoa* needs re-examination. There appear to be two species rather than one, although currently one is accepted (Karsholt & Razowski, 1996: 248). One of these species is widespread. Specimens of the other in the collection of the BMNH are from Sicily and Dalmatia. It is likely from an examination of the original description that the widespread species is what is generally perceived to be *murinata*, but this

question deserves further study. We have yet to discover if an available name exists for the second species.

### *Minoa murinata murinata* (Scopoli, 1763) (*Phalaena*)

*Minoa cyparissaria* Mann, 1854.

*Geometra euphorbiata* [Denis & Schiffermüller], 1775.

*Phalaena fuscata* Hufnagel, 1767.

*Acidalia italicata* Millière, 1885.

*Phalaena* (*Geometra*) *sordata* Linnaeus, 1767.

*Ph[alaena]* *Geom[etra]* *unicolorata* Hübner, [1787].

Widespread in Europe, Russia, Asia Minor, Central Asia.

FOODPLANTS. Euphorbiaceae: *Euphorbia amygdaloides*.

### *Minoa murinata amylaria* Prout, 1914

Alps, Italy.

### *Minoa murinata limburgia* Lempke, 1969

Netherlands.

### *Minoa murinata lutea* Schwingenschuss, 1954

Russia.

### *Chalyboclydon* Warren, 1893

(Figs 180; 222, 256; 294.)

*Chalyboclydon* Warren, 1893: 366. Type species:

*Chalyboclydon marginata* Warren, 1893: 366.

Description of *Chalyboclydon marginata*

MOTH (Figs 180). *Head*. Frons neither broad nor protuberant. Labial palpi slender, reduced, but extending further from head than in most Asthenini genera. Antenna simple in both sexes, ciliated. *Wings*. Broad, off-white with dark markings at termen similar to those in *Eschatarchia lineata*. Forewing broad, apex slightly produced, termen angled medially, weakly crenulated above angle, straight below angle; hindwing with termen angle more marked than in forewing, produced as in *E. marginata*; cell of both wings extending well beyond 1/3 length of wing, discocellulars strongly oblique; forewing with small single areole,  $R_{1-5}$  stalked,  $R_1$  diverging from stem after  $R_5$  and well beyond end of areole; hindwing with  $Sc+R_1$  combined with  $R_s$  for 3/4 length of cell,  $R_s$  and  $M_1$  stalked,  $M_2$  arising from above middle of discocellulars,  $M_3$  not stalked.

MALE GENITALIA (Figs 222, 256). Saccus broad. Labides narrow, weakly sclerotized. Juxta narrow. Valva narrow; costa weakly sclerotized, gently convex

medially and with a denticle arising subterminally; sacculus well sclerotized, with broad lobe medially. Aedeagus: vesica with group of cornuti. Abdominal sternum A8 unmodified.

**FEMALE GENITALIA** (Fig. 294). Ductus bursae short and sclerotized merging with long corpus bursae. Corpus bursae with one signum in form of a prominent band from which extends strong spines; second signum irregular, bearing a number of strong denticles; neither signum composed of radiating denticles or spines. Sternum A7 forming a well-sclerotized, crescent-shaped plate near ostium bursae.

**DIAGNOSIS.** The wing colour, pattern and venation resemble, to some degree, those features in *Eschatarchia*. In both, the angle in the middle of the hindwing termen is pointed. *Chalyboclydon marginata* may be distinguished by its much longer palpi and the very weakly angled forewing termen. The genitalia differ significantly (compare figures). The wing pattern distinguishes *C. marginata* from other genera.

**DISTRIBUTION.** India, Sikkim, Burma, China.

**REMARKS.** The genus lacks the typical asthenine signum, and the valvae are narrower and their sclerotizations more complex than in the Asthenini.

*Chalyboclydon* was described by Warren (1893: 366) as a monotypic genus, from two localities 'Sikkim' and 'Momeit, Burmah', in a paper including descriptions of various genera and species in the H.J. Elwes collection, housed in the BMNH. Although Warren's description was said to be of the female sex, all three syntypes of *marginata* are males. There is a further specimen, a female, labelled as being from 'Darjiling'.

The species *C. flexilinea* was described later (Warren, 1898: 22) from 'One specimen from the Khasis. Closely allied to but apparently distinct from the Sikkim *marginata*.' This specimen, the holotype, is a male and bears a label, in Warren's hand, 'Chalyboclydon flexilinea Warr Type ♀'. A second label, by Prout, states: 'Chalyboclydon marginata Warr.' Warren gave a figure of 36 mm as the wingspan of the species, which is over 10 mm more than actually is the case for the syntypes of *marginata* and also is much greater than the measurement of *flexilinea*. While Warren's description of *marginata* might fit both species, the colour plate (23: 16) is clearly of *marginata*. Thus despite the confusing label of Prout, and the anomalous wing measurement given by Warren, the identities of the two species do not seem to be in doubt. However, to avoid further confusion, we have fixed the identity of *Chalyboclydon marginata* Warren, see below.

**SPECIES INCLUDED.** One species known. Genitalia examined: *marginata* (male, female).

## *Chalyboclydon marginata* Warren, 1893

*Hydrelia? apicata* Wileman, 1916.

**REMARKS.** To fix the identity of *marginata*, the male syntype housed in the BMNH, illustrated in Fig. 180, and bearing the following label data is here designated as **LECTOTYPE**: Lectotype; Sikkim. Möller. 1888; *Chalyboclydon marginata* Warr. Type B&[handwritten by Warren]; Collectio[n] H.J. Elwes; Rothschild Bequest B.M. 1939-1.

**DISTRIBUTION.** India, Sikkim, Burma, China.

## *Cleptocosmia* Warren, 1896

(Figs 181; 223, 256.)

*Cleptocosmia* Warren, 1896: 383. Type species:

*Cleptocosmia mutabilis* Warren, 1896: 383.

**MOTH** (Fig. 181). *Head*. Male. Frons flat, not broad. Labial palpi broad and long, projecting well beyond head, with segment 3 strongly elongated. Antenna simple, ciliated. Hindtibia bearing many hair-like scales, with a very long hair tuft at base, the two outer spurs of hind tibia also with hair scales. *Wings*. Orange brown; similar in shape to those of *Chalyboclydon marginata* but with forewing slightly narrower and apex rather more sharply angled; termen weakly angled medially; hindwing weakly angled medially. Forewing with hyaline fovea, and with the basal half of wing clothed with erect hair-like scales creating a fur-like appearance. Venation: cell very short, no longer than 1/3 length of forewing or hindwing; discocellulars nearly straight on forewing, angled and oblique on hindwing; forewing with areole absent, radials stalked with vein  $R_5$  diverging from common stem before (proximal to) divergence point of  $R_1$ ;  $R_{1-5}$  arising before upper angle of cell,  $M_1$  not stalked,  $M_2$  arising slightly closer to  $M_1$  than to  $M_3$ ; hindwing with  $Sc+R_1$  combined with  $Rs$  to 3/4 of cell,  $Rs$  stalked with  $M_1$ ,  $M_3$  stalked with  $CuA_1$ ,  $CuA_2$  arising near lower angle of cell.

Female unknown.

**MALE GENITALIA** (Fig. 223, 256). Saccus rounded. Labides absent. Juxta broad, weakly sclerotized. Valva: broad, setose; costa with short point extending at middle; sacculus not extended, folded near base of valva and strongly setose. Aedeagus: broad; vesica with two large spines and some small ones.

**DIAGNOSIS.** *Cleptocosmia mutabilis* may be recognized by the fur-like appearance of the basal half of forewing in the male. The erect, sharp angle at the middle of the costa of the valva, and the presence of two huge spines on the vesica of the aedeagus is also very characteristic. The venation is almost the same as that of '*Chalyboclydon flexilinea*', but, besides the fur-like scaling on the forewing, it can also be distinguish from that genus by long palpi, very weakly marked wings and the form of the male genitalia.



DISTRIBUTION. Australia.

REMARKS. Although Warren originally placed this genus in the 'Astheninae' (i.e., Asthenini), Nielsen, Edwards & Rangsi (1996) excluded it from the tribe by listing it under a heading 'Unplaced tribe'. The long labial palpi, the normal frons, the hairy hind tibia and forewing are all unusual. The female is unknown, so we are unable to comment on the form of the signum. On balance, however, like Nielsen *et al.* (1996) we are unable to place *Cleptocosmia* to tribe.

The species is known from only the male holotype in the BMNH, and a further male recently discovered in the accessions of the ANIC. We are grateful to Mr E.D. Edwards for searching the ANIC collections.

SPECIES INCLUDED. One species. Genitalia examined: *mutabilis* (male).

### *Cleptocosmia mutabilis* Warren, 1896

Australia.

### *Eois* Hübner, 1818

(Figs 182–184, 224, 257.)

*Eois* Hübner, 1818: 27. Type species: *Eois russearia* Hübner, 1818: 27.

*Cretheis* Meyrick, 1886: 192, type species *Cretheis cymatodes* Meyrick, 1886: 193.

In its broadest sense (e.g., Holloway, 1997, and as catalogued in Scoble, 1999), *Eois* is a large genus with c. 250 species, the type species of which was described from Surinam. A list of the generic synonyms is also provided by Holloway (1997: 184), who examined the type species of the names involved. Holloway suggested that despite some doubts that the Old World species of *Eois* might not be congeneric with those from the New World, most species were correctly united under the single genus. The basis of Holloway's argument lies chiefly in the presence of a multispined signum set into the wall of the corpus bursae. *Eois* is certainly in need of a species-level review, an exercise that would help further investigation of the question of its monophyly.

If the suggestion is accepted that *Eois* is monophyletic, with relatively minor adjustment to its composition, the question arises over its position in relation to the Asthenini. Notable asthenine characters include small labial palpi and a strongly reduced/lost uncus. The shape of the valva is also remarkably similar to that in Asthenini. However, unlike the position in Asthenini, labides are absent and the signum is distinctive, differing markedly from that seen in typical Asthenini. Even if the Old World species should be shown not to be congeneric with those of the New World, we would exclude them from the Asthenini because of these features.

*Cretheis* (Figs 182, 224, 257) is probably a synonym of *Eois* Hübner although the Australian species of *Eois* were included in *Cretheis* by McQuillan & Edwards (in Nielsen, Edwards & Rangsi, 1996: 228). As with many species of *Eois* it shares some features of Asthenini, including short, narrow palpi, a strongly reduced uncus, and the presence of a small extension of the sacculus. It was included in the tribe by McQuillan & Edwards (in Nielsen, Edwards & Rangsi, 1996: 227), but is excluded here because of the very different signum in the female, which is robust, multispined and has its base usually set in an evagination of the bursa wall. Furthermore, the frons is very narrow.

SPECIES INCLUDED. Two hundred and forty seven species of *Eois* (including those in *Cretheis*) are listed in Scoble (1999). We have not reviewed the species of this large genus, so they are not listed here.

### *Pseudopolynesia* Holloway, 1997

(Figs 185, 225.)

*Pseudopolynesia* Holloway, 1997: 190. Type-species: *Pomasia amplificata* Walker, 1861: 658.

One described species was included in the genus by Holloway (1997), who pointed out that there were at least two in the group, which extends from Sundaland to New Guinea. The remarkable similarity in the colour pattern of *Pseudopolynesia* and *Polynesia* encouraged us to study the genus to see if there was an asthenine association of *Pseudopolynesia*.

The labial palpi are prominent and extended strongly in front of the head. In the male genitalia (Fig. 225), the tegumen is dome-shaped and the uncus appears to be absent. The sclerotizations of the anellus are complex, but labides do not seem to be present. In the female, the signum is absent and the corpus bursae is double with a posterior, spinose component and a flimsy anterior part.

Characters that support the exclusion of *Pseudopolynesia* from the Asthenini are the presence of well-developed labial palpi, the absence of labides, the lack of an extension of the sacculus and the absence of an asthenine signum. While an uncus is absent from Asthenini and *Pseudopolynesia*, this situation is not unique to the tribe and does not define it alone. Denticles are present on the bursa copulatrix of *Pseudopolynesia* and *Eupithecia*, although those in *Pseudopolynesia* are not as robust.

Despite the similarity of the wing colour and pattern to *Polynesia*, other morphological evidence suggests that *Pseudopolynesia* should be excluded from the Asthenini.

DISTRIBUTION. From Sundaland to New Guinea.

REMARKS. For further details see Holloway, 1997.

SPECIES INCLUDED. One species.

***Pseudopolynesia amplificata* Walker, 1861**

Borneo.

***Pseudopolynesia hebe* Bethune-Baker, 1915**

*Pseudopolynesia phanoides* Debauche

*Pseudopolynesia praelustris* Prout

New Guinea, Sulawesi, S. Moluccas.

REMARKS. Holloway (1997: 190) suggested that *hebe* and *praelustris*, which were previously described as subspecies of *amplificata*, might better be placed as 'races' of *hebe*.

***Chaetolopha* Warren, 1899**

(Fig. 186.)

*Chaetolopha* Warren, 1899: 41. Type species: *Scordylia oxyntis* Meyrick, 1891: 817.

The genus was included in the Asthenini by McQuillan & Edwards (*in* Nielsen, Edwards & Rangsi, 1996: 227) and has been revised by Schmidt (*in press*). It includes an assemblage of species with considerable variation in genital structure. In none of these species does the morphology suggest that the genus belongs to Asthenini.

Characters of the type species suggesting that *Chaetolopha* should be excluded from Asthenini include a non-protuberant frons and well-developed, rough-scaled labial palpi. The uncus is well-developed. Structures resembling labides are well-sclerotized and arise from a pair of flask-shaped sclerites composing the juxta. We have not observed this rather peculiar arrangement in Asthenini. The sacculus of the valva is not extended. In the female genitalia, the signum is not asthenine.

SPECIES INCLUDED. Six species, all from Australia, are included by Schmidt (*in press*), who has assigned other species previously in *Chaetolopha* to a new genus from Papua New Guinea.

Eleven species were listed in Scoble (1999). We have not reviewed the species, so they are not included here.

***Trichodezia* Warren, 1895**

(Fig. 187.)

*Trichodezia* Warren, 1895: 119. Type species: *Odezia albivittata* Guenée, [1858]: 520.

*Trichodezia* was assigned to the Asthenini by Forbes (1948: 131) and listed there by Ferguson *in* Hodges (1983). Characters suggesting that this genus should be excluded from Asthenini include the presence of

strong palpi and a well developed uncus. The ductus bursae is extremely short and the corpus bursae has a small signum, but not of the asthenine kind.

A male and female of the type species (*T. albivittata*) were examined.

DISTRIBUTION. North America, Japan, Eurasia.

SPECIES INCLUDED. Five species were listed in Scoble (1999). We have not reviewed the species, so they are not listed here.

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1 *A. albidaria*

2 *A. albosignata*

3 *A. albulata*

4 *A. anseraria anseraria*



5 *A. lassa*

6 *A. livida*

7 *A. melanosticta*

8 *A. nymphacata*



9 *A. ochrifasciaria*

10 *A. octomaculata*

11 *A. opedogramma*

12 *A. plenaria*



13 *A. sachaliensis*

14 *A. tchratechra*

15 *A. undulata*

16 *H. aggerata*



17 *H. arizana*

18 *H. aurantiaca*

19 *H. bella*

20 *H. bicauliata*



21 *H. bicolorata*

22 *H. binotata*

23 *H. castaria*

24 *H. cingulata*

Figs 1–24. Adults. 1–15, *Asthena* spp.; 16–24, *Hydrelia* spp. Scale lines: 10 mm.





25 *H. condensata*



26 *H. conspicuaria*



27 *H. controversa*



28 *H. crocearia*



29 *H. elegans*



30 *H. enisaria*



31 *H. flammeolaria*



32 *H. flavilinea*



33 *H. fuscocastanea*



34 *H. gracilipennis*



35 *H. impleta*



36 *H. inornata*



37 *H. laetivirga*



38 *H. leucogramma*



39 *H. lineata*



40 *H. lucata*



41 *H. marginepunctata*



42 *H. microptera*



43 *H. nepalensis*



44 *H. nisaria*



45 *H. ochrearia*



46 *H. ornata*



47 *H. parvularia*



48 *H. parvulata*



49 *H. rhodoptera*



50 *H. rubraria*



51 *H. rubricosta*



52 *H. rubrilinea*



53 *H. rubrivena*



54 *H. rufigrisea*



55 *H. rufinota*



56 *H. sanguiflua*



57 *H. sanguinipлага*



58 *H. sericea sericea*



59 *H. sericea pampesia*



60 *H. shioyana*



61 *H. speciosa*



62 *H. subcingulata*



63 *H. sublatsaria*



64 *H. subobliquaria*



65 *H. subtestacea*



66 *H. sylvata*



67 *H. undularia*



68 *H. undulosata*



69 *A. pictaria pictaria*



70 *A. pictaria brevibasis*

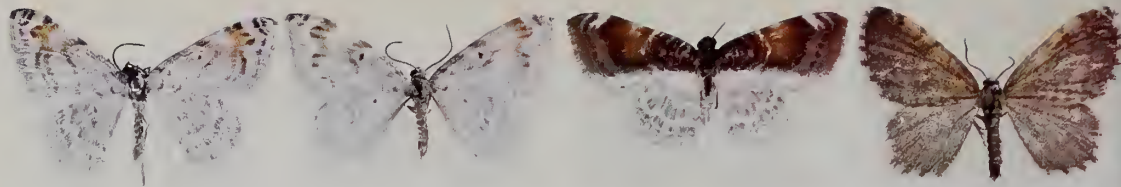


71 *A. plumbeolineata*



72 *A. punctilinearia*





73 *A. recurvilineata*  
*recurvilineata*

74 *A. recurvilineata*  
*meroplyta*

75 *A. venusta*

76 *E. nebulata*



77 *E. rubropunctaria*



78 *E. lineata*



79 "*C.*" *flexilinea*



80 *P. phoenicosoma*  
*phoenicosoma*



81 *P. phoenicosoma*  
*semilauta*



82 *A. amblycoma*



83 *A. anisobapta*



84 *A. ansorgei*



85 *A. barnsac*



86 *A. dentatissima*



87 *A. fernandi*



88 *A. flavicomma*



89 *A. furtiva*



90 *A. lophoptera*



91 *A. malostigma*



92 *A. nesiotis*



93 *A. polydora*



94 *A. proschora*



95 *psephotaenia*



96 *A. pycnoconia*

Figs 73–96. Adults. 73–75, *Agnibesa* spp.; 76, *Euchoeca* spp.; 77, *Epicyme* sp.; 78, *Eschatarchia* sp.; 79, '*Chalyboclydon*' sp.; 80–81, *Palpoctenidia phoenicosoma*; 82–96, *Asthenotricha* spp. Scale lines: 10 mm.





97 *A. pythia*



98 *A. semidivisa semidivisa*



99 *A. semidivisa euchroma*



100 *A. serraticornis*



101 *A. straba*



102 *A. torata*



103 *A. tripogonias*



104 *A. argyridia*



105 *A. candace*



106 *A. costalis*



107 *A. inutilis*



108 *A. meruana*



109 *A. sjostedti sjostedti*



110 *A. strangulata*



111 *A. unipecten*



112 *V. accentuata*



113 *V. albinea*



114 *V. blomeri blomeri*



115 *V. brevipectinata*



116 *V. cambrica cambrica*



117 *V. comptaria*



118 *V. conisaria conisaria*



119 *V. crassisigna*



120 *V. eucosma*



121 *V. inefficax*



122 *V. kioudjrouaria*



123 *V. laria laria*



124 *V. lilacina lilacina*



125 *V. limata*



126 *V. lineata*



127 *V. marmoraria*



128 *V. megaspilata*



129 *V. nigrifurca*



130 *V. obliquisigna*



131 *V. ochrota*



132 *V. pallidaria*



133 *V. phasma*



134 *V. planicaput*



135 *V. punctiuncula*



136 *V. purpuraria*



137 *V. semistrigata*  
*semistrigata*



138 *V. sikkimensis*



139 *V. tchrraria*



140 *V. yasudai*



141 *N. duodecimlineata*  
*duodecimlineata*



142 *H. caeruleolineata*



143 *H. pluristrigata*



144 *M. azela*

Figs 121–144. Adults. 121–140, *Venusia* spp.; 141, *Nomenia* sp.; 142–143, *Hastina* spp.; 144, *Macrohastina* sp. Scale lines: 10 mm.





145 *M. gemmifera*



146 *M. stenozona*



147 *B. albolucens*



148 *B. subviridata*



149 *B. viridata*



150 *L. quadrilinea*



151 *P. flexilinea*



152 *P. aedoea*



153 *P. balioloma*



154 *P. burmensis*



155 *P. character*



156 *P. dimorpha*



157 *P. euphylla*



158 *P. inhaesa*



159 *P. leucydra*



160 *P. limnaea*



161 *P. nubivaga*



162 *P. paucilinea*



163 *P. prouti*



164 *P. pulchraria*



165 *P. scoliota*



166 *P. subpurpureata*



167 *P. euthecta*



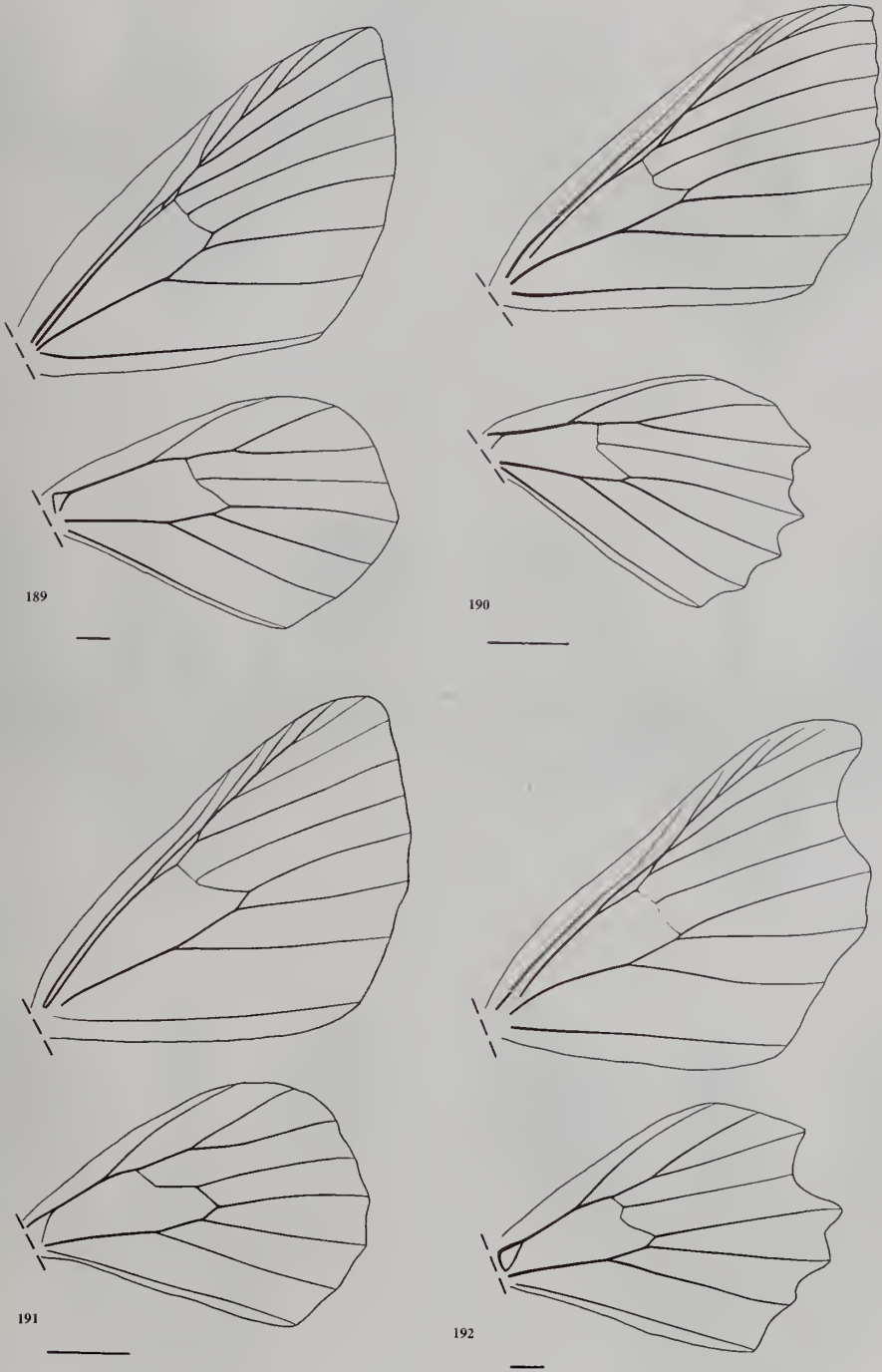
168 *P. papuensis*

Figs 145–168. Adults. 145–146. *Macrohastina* spp.; 147–149, *Biastina* spp.; 150, *Leucotenorrhoe* sp.; 151, *Parasthena* sp.; 152–168, *Poecilasthena* spp. Scale lines: 10 mm.



169 *P. anthodes*170 *P. schistaria*171 *P. xylocyma*172 *P. curtitiba*173 *P. sunandava*174 *P. truncapex*175 *A. dharmasale*176 *A. distorta*177 *A. plicataria*178 *M. murinata murinata*179 *Minoa* sp.180 *C. marginata*181 *C. mutabilis*182 *E. cymatodes*183 *E. plicata*184 *E. russearia*185 *P. hebe*186 *C. oxyntis*187 *T. albovittata*188 *S. fulgurata*

Figs 169–188. 169–171, *Poecilasthena* spp.; 172–174, *Polynesia* spp.; 175–177, *Anydreliia* spp.; 178–179, *Minoa* spp.; 180, *Chalyboclydon* sp.; 181, *Cleptocosmia* sp.; 182–184, *Eois* spp.; 185, *Pseudopolynesia* sp.; 186, *Chaetolopha* sp.; 187, *Trichodezia* sp.; 188, *Sterrhochaeta* sp. Scale lines: 10 mm.



**Figs 189–192.** Wing venation. 189, *Asthena albulata*; 190, *Agnibesa pictaria*; 191, *Venusia cambrica*; 192, *Hastina caeruleata*. Scale lines: 189, 192, 1.0 mm.; 190, 191, 2.5 mm.



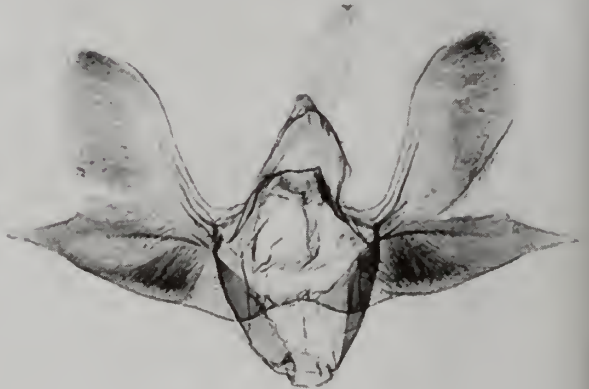
193 *A. albulata*



194 *A. opedogramma*



195 *A. undulata*



196 *H. bella*



197 *H. sylvata*



198 *A. pictaria*





199 *E. nebulata*



200 *E. rubropunctaria*



201 *E. lineata*



202 "*C.*" *flexilinea*



203 *P. phoenicosoma semilauta*

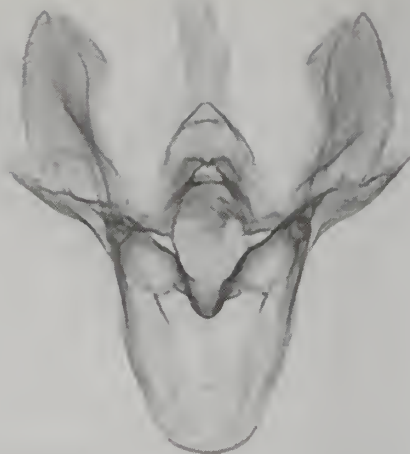


204 *A. dentatissima*

**Figs 199–204.** Male genitalia. 199, *Euchoeca* sp.; 200, *Epicyme* sp.; 201, *Eschatarchia* sp.; 202, '*Chalyboclydon*' sp.; 203, *Palpoctenidia* sp.; 204, *Asthenotricha* sp.



205 *A. argyridia*



206 *V. cambrica*



207 *V. obliquisigna*



208 *V. ochrota*



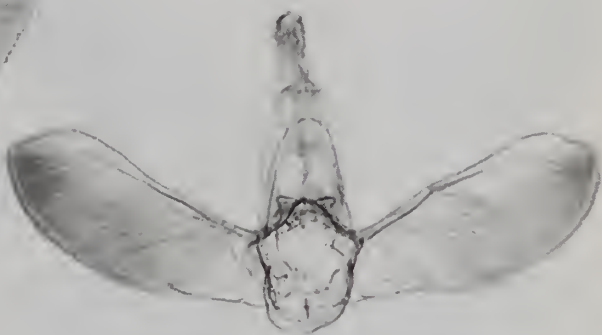
209 *N. duodecimlineata*



210 *H. caeruleolineata*



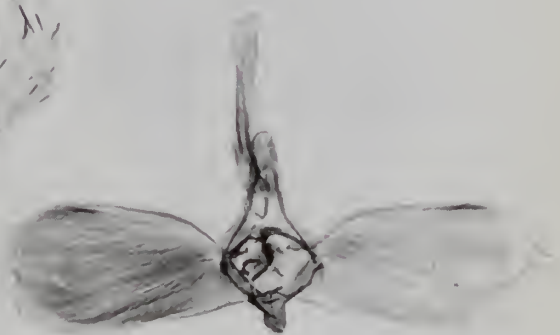
211 *M. azela*



212 *B. albolucens*



213 *L. quadrilinea*

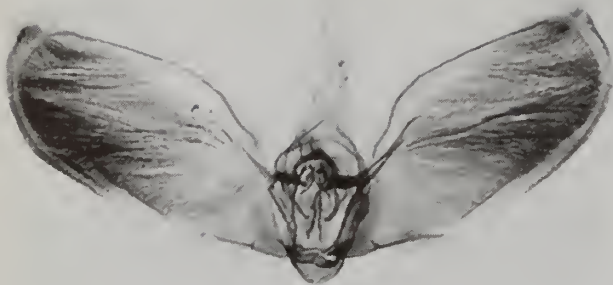


214 *P. flexilinea*



215 *P. dimorpha*





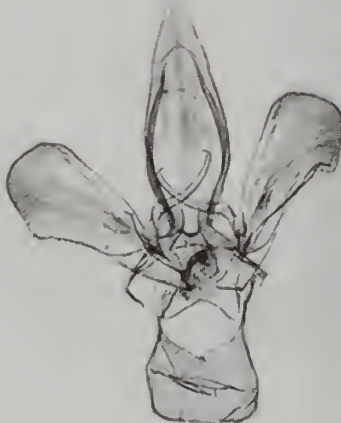
216 *P. pulchraria*



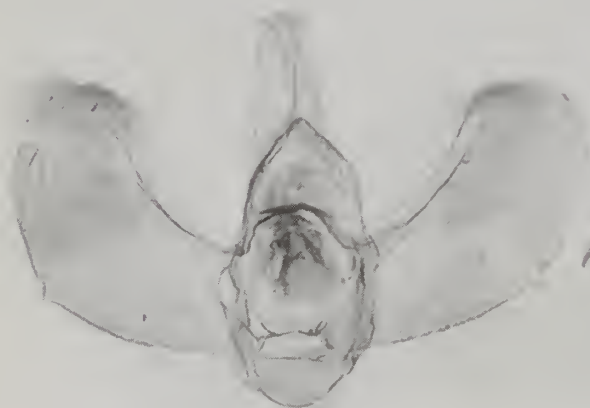
217 *P. papuensis*



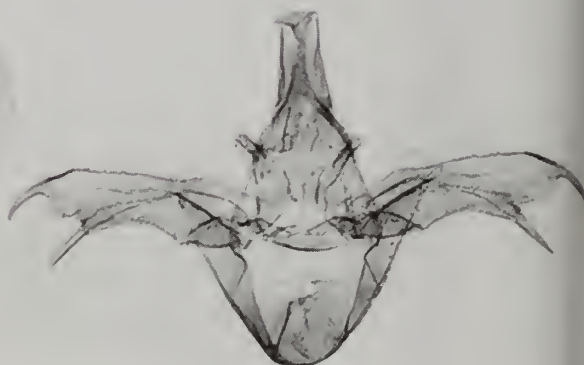
218 *P. schistaria*



219 *P. sunandava*



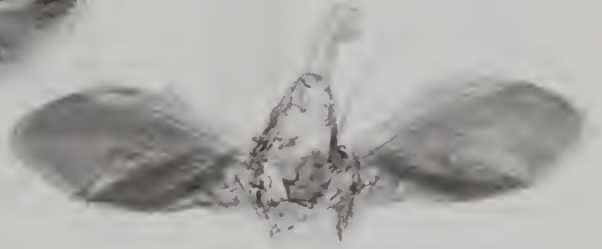
220 *A. plicataria*



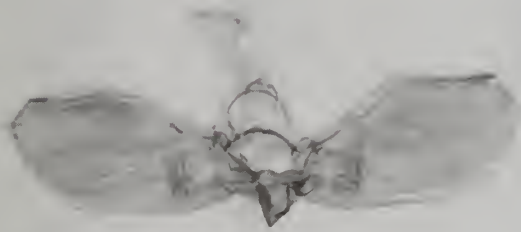
221 *M. murinata*



222 *C. marginata*



223 *C. mutabilis*



224 *E. cymatodes*



225 *P. hebe*



226 *A. albulata*



227 *A. opedogramma*



228 *A. undulata*



229 *H. bella*



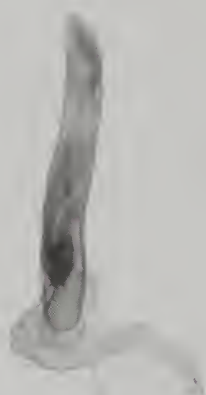
230 *H. sylvata*



231 *A. pictaria*



232 *E. nebulata*



233 *E. rubropunctaria*



234 *E. lineata*



235 *"C." flexilinea*



236 *P. phoenicosoma*



237 *A. dentatissima*



238 *A. argyridia*



239 *V. cambrica*



240 *V. obliquisigna*

**Figs 226–240.** Aedeagus. 225–228, *Asthena* spp.; 229–230, *Hydrelia* spp.; 231, *Agnibesa* sp.; 232, *Euchoeca* sp.; 233, *Epicyme* sp.; 234, *Eschataarchia* sp.; 235, '*Chalybochlydon*' sp.; 236, *Palpootenidia* sp.; 237–238, *Asthenotricha* spp.; 239–240, *Venusia* sp.





241 *V. ochrota*      242 *N. duodecimlineata*      243 *H. caeruleolineata*      244 *M. azela*      245 *B. albolucens*



246 *L. quadrilinea*      247 *P. flexilinea*      248 *P. dimorpha*      249 *P. pulchraria*      250 *P. papuensis*



251 *P. schistaria*      252 *P. sunandava*      253 *A. plicataria*

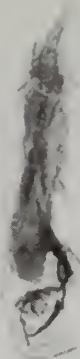
**Figs 241–253.** Aedeagus. 241, *Venusia* sp.; 242, *Nomenia* sp.; 243, *Hastina* sp.; 244, *Macrohastina* sp.; 245, *Bihastina* sp.; 246, *Leucoctenorrhoe* sp.; 247, *Parasthena* sp; 248–251, *Poecilasthena* spp.; 252, *Polynesia* sp.; 253, *Anydreliia* sp.



254 *M. murinata*



255 *C. marginata*



256 *C. mutabilis*



257 *E. cymatodes*



258 *P. hebe*



259 *P. phoenicosoma*  
*semilauta*



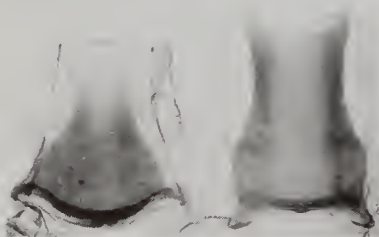
260 *P. flexilinea*



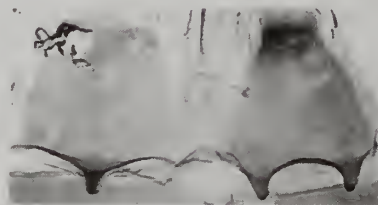
261 *P. flexilinea*



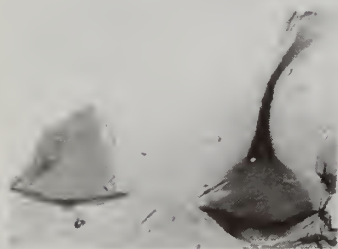
262 *P. dimorpha*



263 *P. pulchraria*



264 *P. papuensis*



265 *P. schistaria*



266 *P. sunandava*

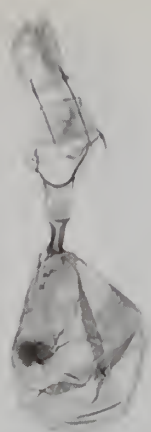


267 *M. murinata*

**Figs 254–267.** 254–258, aedeagus; 259–267, male abdomen. 254, *Minoa* sp.; 255, *Chalyboclydon* sp.; 256, *Cleptocosmia* sp.; 257, *Eois* sp.; 258, *Pseudopolynesia* sp.; 259, *Palpoctenidia* sp.; 260–261, 260 sternum, 261 tergum, *Parasthena* sp.; 262–265, *Poecilasthena* spp.; 266, *Polynesia* sp.; 267, *Minoa* sp.



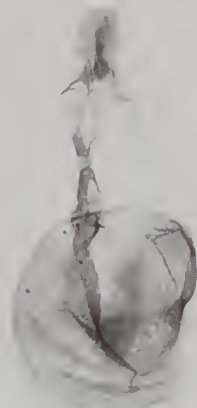
268 *A. albulata*



269 *A. tchratraria*



270 *H. bella*



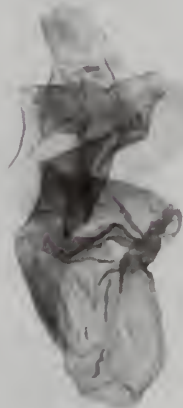
271 *A. pictaria*



272 *E. nebulata*



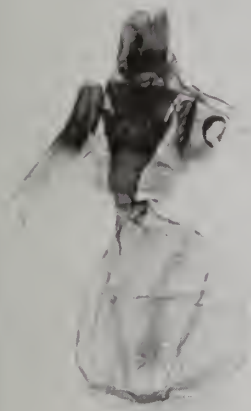
273 *E. rubropunctaria*



274 *E. lineata*



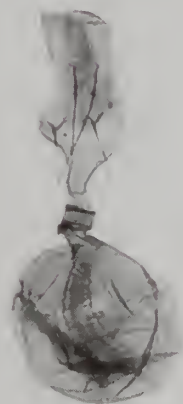
275 "*C.*" *flexilinea*



276 *P. phoenicosoma*



277 *A. dentatissima*



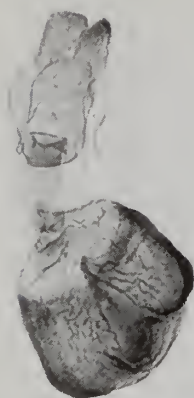
278 *A. argyridia*



279 *V. cambrica*

**Figs 268–279.** Female genitalia. 268–269, *Asthena* spp.; 270, *Hydrelia* sp.; 271, *Agnibesa* sp.; 272, *Eucioeca* sp.; 273, *Epicyme* sp.; 274, *Eschatarchia* sp.; 275, '*Chalyboclydon*' sp.; 276, *Palpoctenidia* sp.; 277–278, *Asthenotricha* sp.; 279, *Venusia* sp.

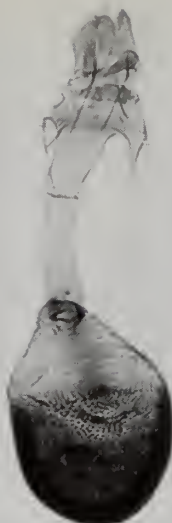




280 *V. obliquisigna*



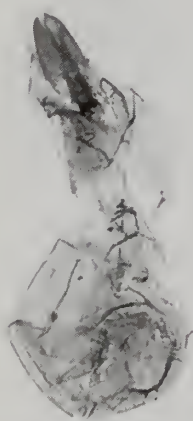
281 *N. duodecimlineata*



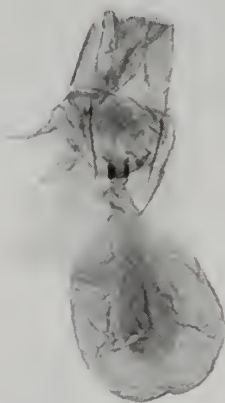
282 *H. caeruleolineata*



283 *M. azela*



284 *B. albolucens*



285 *L. quadrilinea*



286 *P. flexilinea*



287 *P. dimorpha*



288 *P. pulcherraria*



289 *P. papuensis*

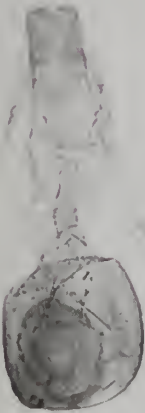


290 *P. schistaria*



291 *P. sunandava*

**Figs 280–291.** Female genitalia. 280, *Venusia* sp.; 281, *Nomenia* sp.; 282, *Hastina* sp.; 283, *Macrohastina* sp.; 284, *Bihostina* sp.; 285, *Leucoctenorrhoe* sp.; 286, *Parasthena* sp.; 287–290, *Poecilasthena* spp.; 291, *Polynesia* sp.



292 *A. plicataria*



293 *M. murinata*



294 *C. marginata*



295 *P. dimorpha*

**Figs 292–295.** Female genitalia. 292, *Anydrelia* sp.; 293, *Minoa* sp.; 294, *Chalyboclydon* sp.; 295, signum of *Poecilasthena* sp.